



United States Department of Agriculture

Draft Assessment Report of Ecological, Social and Economic Conditions on the Custer Gallatin National Forest



Forest Service

November 2016

Cover Photo: Shots across the Custer Gallatin National Forest Top Left to right - Hiking Beartooth Ranger District, Absaroka-Beartooth Wilderness; Lake Plateau, Absaroka-Beartooth Wilderness (T. Jones); Cattle graze, Long Pines, Sioux Ranger District; Bottom Left – Moose and Grouse, Gallatin Canyon, Bozeman Ranger District; Elephanthead Mountain, Yellowstone Ranger District, Gallatin Avalanche Center.

Note: We make every effort to create documents that are accessible to individuals of all abilities; however, limitations with our word processing programs may prevent some parts of this document from being readable by computer-assisted reading devices. If you need assistance with this document, please contact the Custer Gallatin National Forest at (406) 587-6735.

Custer Gallatin National Forest Assessment Report

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Abstract: The assessment report presents and evaluates existing information about relevant ecological, economic and social conditions, trends, risks to sustainability, context within the broader landscape and relationship to the Custer Gallatin forest plan.

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For further information or for copies of individual specialist reports, see the Custer Gallatin National Forest Web page at:
www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802
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Introduction

*“Our diversity is not a source of weakness;
it is a source of strength. It is a source of our success.”*

- Colin Powell

The Sum of Its Parts

If the Custer Gallatin were a person, it could trace its family roots back to the 1800s. The present national forest includes lands that at one time or another were in 16 forest reserves and six national forests, which over the years had many different names. Since 2014, the Custer National Forest and Gallatin National Forests have been managed together as the Custer Gallatin.

Perhaps the best way to view the Custer Gallatin today is as the sum of some very diverse parts, from the majestic forested peaks and alpine lakes of south-central Montana to the expansive pine savannas of northwestern South Dakota. But this still doesn't give us the full picture of what the Custer Gallatin means today. To do so, it's helpful to view the national forest for its social, economic and environmental benefits, which is one of the purposes of this report.



The Gallatin National Forest, 1955 (photo courtesy of National Museum of Forest Service History)

Here are a few of these benefits, all of which are discussed in the following pages:

- recreational opportunities ranging from hiking, sightseeing, skiing, snowmobiling, biking, motorized trail use, horseback riding and camping;
- habitat for iconic western North American species, including grizzlies, bison and wild horses;
- internationally renowned blue-ribbon fishing opportunities;
- the Beartooth Highway, known to many as “the most beautiful drive in America;”
- cultural and historic sites;
- clean air and water;
- the only palladium mines in the United States;
- economic benefits related to tourism and recreation, including resorts and outfitter services;
- natural resources such as timber, firewood, minerals, and forage for livestock grazing; and
- utility infrastructure such as powerlines and pipelines.

An Overview of the Custer Gallatin

The Custer Gallatin National Forest consists of several geographically isolated land units extending from the Montana-Idaho border into South Dakota. Inside the administrative boundary are more than 3.4 million acres. More than 3 million of these acres are National Forest System lands, which are often referred to as the “plan area.”

With headquarters in Bozeman, the national forest includes portions of 11 counties and has seven ranger district offices located in West Yellowstone, Bozeman, Livingston, Gardiner, Red Lodge and Ashland, Montana and in Camp Crook, South Dakota. Work centers are also located in Big Timber and Billings, Montana.

Because of the national forest’s diversity and geographic size, five “landscape areas” are used for descriptive and analysis purposes. Table 1 lists these areas by acreage while Figure 1 shows these areas across the national forest. In this report, the Ashland and Sioux Districts are often referred to as the “pine savanna” units, while the other three landscape areas are often referred to as the “montane” units.

Table 1. Custer Gallatin landscape area by National Forest System acreage

Landscape Area	Acres
Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains	2,158,640
Bangtail, Bridger and Crazy Mountains	205,025
Pryor Mountains	75,067
Ashland District	436,133
Sioux District	164,460

A New Management Plan

The National Forest Management Act of 1976 requires every national forest or grassland managed by the Forest Service to develop, maintain and periodically revise an effective land management plan (also known as a forest plan), and to amend or revise the plan when conditions significantly change. The process for the development and revision of plans, along

with the required content of plans, is outlined in planning regulations, often referred to as the Planning Rule. The current Planning Rule, which can be found on the Forest Service Web page at www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5362536.pdf, became official in 2012.

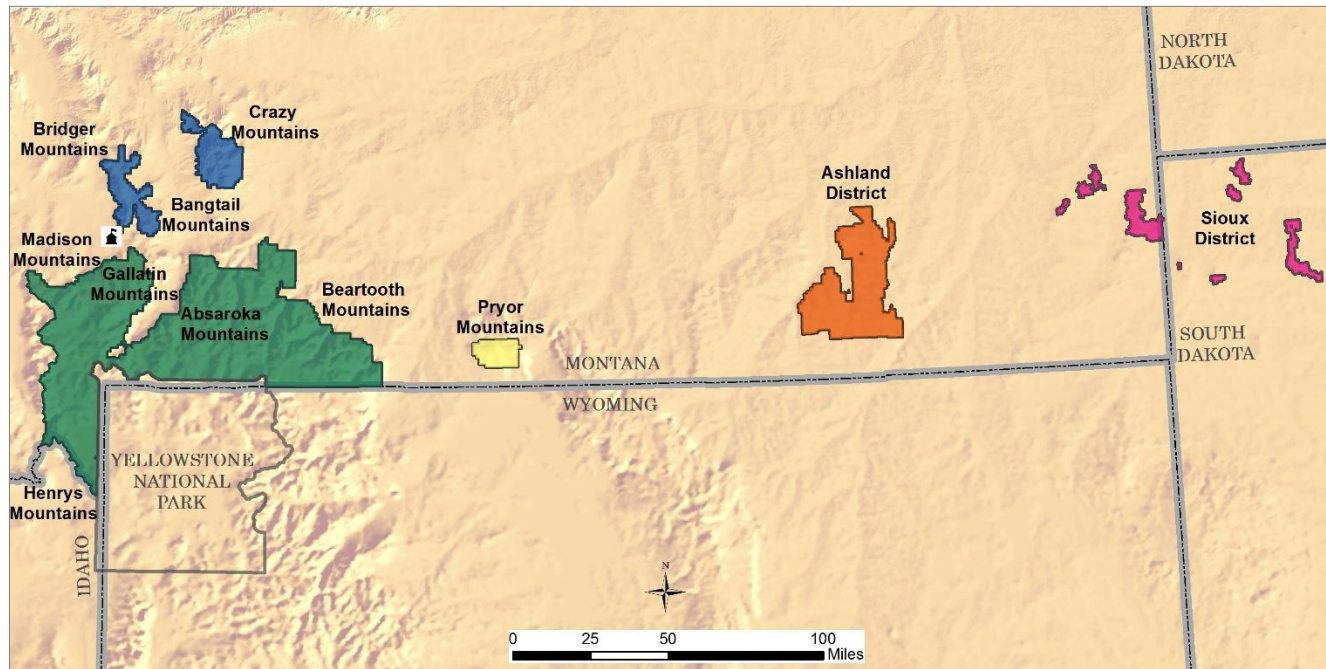


Figure 1. The five landscape areas of the Custer Gallatin National Forest

The Custer Gallatin National Forest is in the first phase of a four-year planning process to revise, update and combine the Custer and Gallatin forest plans into one plan. As explained in the 2012 Planning Rule, planning for a national forest is an iterative process that includes an assessment, revision and monitoring. This document represents a high-level summary of the assessment process. In-depth “specialist reports” are cited at the end of every section in the document and can be found on the Custer Gallatin National Forest Web page at www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802 or by contacting the forest plan revision team at (406) 587-6735 or cgplanrevision@fs.fed.us.

This document represents a high-level summary of the assessment process. In-depth “specialist reports” are cited at the end of every section in the document.

Best Available Scientific Information

During the assessment process, Custer Gallatin specialists used the best available data and science to evaluate conditions, trends and risks. A wide range of relevant, quality data was used, including monitoring reports. Full reference citations can be found in the individual specialist reports cited at the end of each section.

Public and Tribal Involvement in the Assessment Process

*"We always hear about the rights of democracy,
but the major responsibility of it is participation."*

- Wynton Marsalis

The Custer Gallatin forest plan revision process was launched in January 2016 with email announcements, a press release, social media and Web site information. To kick off the assessment process, a Federal Register notice of initiation was published on February 4th. The forest plan revision team held 15 public meetings in February and March 2016 to explain about forest plan revision, to describe the scope and scale of the national forest and to gather local knowledge and information, current trends, conditions, perceptions and concerns. More than 500 people attended 15 meetings in the Montana communities of Ashland, Big Sky, Big Timber, Billings, Bozeman, Broadus, Colstrip, Columbus, Cooke City, Ekalaka, Gardiner, Livingston, Red Lodge and West Yellowstone and in Buffalo, South Dakota.

A second set of eight public meetings and three webinars was conducted June 14 – 30. The meetings were held in Ashland, Big Timber, Bozeman, Ekalaka, Gardiner, Red Lodge, West Yellowstone and Buffalo. In these meetings, participants shared information, discussed initial assessment results and early ideas of the need to change the existing forest plans. The meetings provided a forum for people to share their hopes, priorities and concerns related to the Custer Gallatin National Forest.



A June 2016 meeting in Bozeman grouped participants to discuss issues and information

Custer Gallatin representatives also contacted 15 tribes and interacted with a variety of stakeholders including Federal, State and local agencies, special interest groups and other entities, including an intergovernmental working group and the Custer Gallatin Working Group.

Using another approach to gather information, Custer Gallatin planners created a questionnaire related to current forest management practices. Stakeholders sent in more than 120 questionnaire responses and letters and completed more than 1,100 form letters regarding migratory buffalo, raising issues related to multiple uses, recreation, travel opportunities, access, designated areas, inter-agency coordination, habitat connectivity and the importance of ecosystem health.

The plan revision team examined all comments, information and published sources submitted by the public and incorporated them as appropriate into the assessment process. All public comments received during the assessment phase will be reviewed and considered during development of plan components and other plan content.

ASSESSING ECOSYSTEMS AND WATERSHEDS

Climate

"In our everyday experience, if something has never happened before, we are generally safe in assuming it is not going to happen in the future. But the exceptions can kill you and climate change is one of those exceptions."

- Al Gore

Climate Change In Our Back Yard

In summer 2016, something unprecedented occurred in the Custer Gallatin area: Thousands of dead mountain whitefish were discovered floating in the Yellowstone River. In response, nearly 200 miles of river were closed to all water recreational activities. The cause of the die-off was kidney disease triggered by a parasite that thrives when water is slow and warm. It's probably not the last time this will happen. In fact, the parasite has already been found in similar geographic areas and may spread to other fish species, such as rainbow trout and Yellowstone cutthroat trout.

So the big question is: What caused the lower water levels and warmer water?

Average air temperatures on the Custer Gallatin have increased during the last century, and continued increases are expected.

On the Custer Gallatin, average air temperatures have increased over the last century. Continued increases are expected. There are several expected environmental consequences on the Custer Gallatin and surrounding areas, and warmer water is one of them. Here are a few others, along with a few potential social and economic consequences:

- lower base stream flows (the portion of stream flow that is not runoff and results from gradual seepage of water from the ground)
- changes to vegetation mix and life cycles
- increased drought frequency and duration
- more intense rainstorms and snowstorms
- increased fire frequency and severity
- increased challenges related to maintaining or restoring species that have diminished over time
- changes to rangeland conditions and permitted livestock grazing levels
- changes to timber production levels
- changes to national forest infrastructure, such as campground locations and bridge sizing
- changes to public experiences, such as scenery, fishing and hunting

Expected Effects to Montane Areas

The montane portions of the national forest (that is, all of the Custer Gallatin except for the Ashland and Sioux Districts) are warmer than they were more than a century ago: Average minimum monthly temperatures have increased by almost 3 degrees Fahrenheit since 1895, while average maximum monthly temperatures have increased by just over a degree in the same timeframe. By 2050, both minimum and maximum mean annual monthly temperatures are projected to increase by at least 4 degrees more. Precipitation levels are more difficult to

predict, but slight increases are expected in every season except summer, which is expected to get drier. On these areas, it's expected that the effects of climate warming will vary locally, based on factors such as altitude, slope and aspect (the compass direction that a slope faces). Some locations may experience dramatic change while others may have no apparent change at all.

The Custer Gallatin may become a refugia for some species—an area where a species can survive after extinction in surrounding areas.

These montane areas are at the edge of warm, wet airflow from the Pacific Ocean and cool, dry airflow from Canada. Both airflows influence local climate and weather. This portion of the Custer Gallatin has historically been the coolest portion of the Forest Service's Northern Region and it's expected to remain so. If this is the case, the Custer Gallatin will likely become a refugia for some species. (A refugia is an area where special environmental circumstances have enabled a species or a community of species to survive after extinction in surrounding areas.)



An alpine lake and stream system that has been identified as a potential climate refugia for native Yellowstone cutthroat trout

Expected Effects to Pine Savanna Areas

The Custer Gallatin pine savanna areas (the Ashland and Sioux Districts) are mainly influenced by cooler, drier airflows from Canada. This is the warmest area of the Forest Service's Northern Region and it's expected to remain this way. On these areas, which have less topographic variability than the montane areas, the effects of climate warming are likely to be relatively consistent.

Average minimum monthly temperatures have increased by 2.5 degrees since 1905 and average maximum monthly temperatures have risen by more than 1 degree. By 2050, both minimum and maximum mean annual monthly temperatures are projected to increase by about 4 degrees. Conditions in this area, which already are naturally dry, are expected to get even drier with a warming climate.



Pine savanna areas on the Custer Gallatin are naturally dry and are expected to get drier with a warming climate

Looking Forward: Conclusions and Concerns

Rising temperatures have already contributed to environmental, economic and social changes across the Custer Gallatin, including the spread of invasive species, increased wildfire frequency and severity, and increased demand for water and energy. This pattern is expected to continue. As with the whitefish die-off, continued environmental changes may result in Custer Gallatin management decisions that are unpopular but necessary, such as access restrictions. Continued monitoring of climate and environmental changes will help Custer Gallatin planners and managers adjust to new and changing conditions and to work with the public to balance sustainability with economic and social needs.

Additional Information

Barndt, S. 2016. Assessment for Forest Plan Revision – Climate Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Soil

*"The soil is the great connector of lives, the source and destination of all...
Without proper care for it we can have no community,
because without proper care for it we can have no life."
- Wendell Berry*

A Vital Natural Resource

The Custer Gallatin's extraordinary topography, wildlife and forests typically get the casual visitors' attention. But a vital part of the national forest's ecosystem literally lies at their feet. Soil provides habitat for both plants and animals and affects how they are distributed in the landscape. It influences the exchange of water and chemical substances between the earth and the atmosphere. Soil also records and reacts to human activities and environmental changes—for better and for worse.

Left to itself, soil conditions are largely dependent on three factors: geology, terrain and climate. Geology is a primary factor for many reasons, because "parent material" (generally, the underlying rock) affects soil mineral levels and water holding ability. In terms of terrain, the soil changes dramatically from a steep mountain slope to a flat grassland area. As for climate, the soil in a warm, dry area will be very different from the soil in a cool, wet area. All of the above affect soil "productivity," which is the ability of the soil to promote and sustain life. Soil differences are reflected by land productivity.



Much of the soil damage on the Custer Gallatin is related to disturbance prior to 1994 (photo courtesy of National Museum of Forest Service History)

Despite these differences, all soils can be disrupted by human-caused activity. Extensive grazing or heavy equipment use can cause soil compaction. Chemicals and severe burning can damage fertility while roads, trails and recreational use can contribute to erosion. Tire treads and hiking boots can bring in invasive weeds.

Different soils have different susceptibility to disturbance: Soil in one area may be unaffected by loss of a few inches of surface soil material, while the same level of disturbance could drastically reduce soil productivity in a more sensitive area.

Forest Service Responsibilities

Soil degradation on National Forest lands was addressed by the National Environmental Policy Act of 1970 and later by the National Forest Management Act of 1976. Each requires that National Forest land (and soil) productivity should not be “permanently degraded” as a result of management actions. Initial Forest Service efforts to implement these laws focused on reducing the density of forest roads and reducing cattle numbers in range allotments. Until the mid-1990s, higher levels of timber harvesting occurred on National Forest System lands, sometimes resulting in high soil disturbance levels. Since then, timber harvest levels have been greatly reduced, harvesting practices have been improved and many national forest roads have been removed.

In 1999, the Forest Service’s Northern Region established 15 percent as the maximum level of “detrimental soil disturbance” allowable in management areas. This level was set to help control soil disturbance associated with timber harvesting and it continues to be used today across all managed areas on the Custer Gallatin.

Custer Gallatin Soil Conditions Today

Much of the soil on the Custer Gallatin is in a relatively undisturbed, natural condition. Overall soil conditions in most areas are in good condition and improved management practices are reducing both the level and severity of soil disturbance being created on the national forest.

Overall soil conditions in most areas of the Custer Gallatin are in good condition.

In certain locations, however, human activities such as timber harvesting, mining, grazing and recreational use have left their mark. The latest estimates for the Custer Gallatin place these areas at about 6 percent of the total land area for which the Forest Service has harvest records. Most of this disturbance occurred prior to 1994, with many of the worst impacts being “legacy” soil disturbances on lands that the Forest Service acquired relatively recently after soil disturbance already existed. Overall, soils in many of these areas appear to have mostly recovered from past harvest activities, except along major log skidding pathways and at log landings. Today, the main sources of concern include soil damage from off-road vehicle use, user-created trails, invasive weeds and erosion after wildfires.

Research and Inventory

The National Forest Management Act requires national forest managers to collect and catalog information about the soil’s potential to produce desired vegetation and the levels of soil disturbance that could reduce that potential. The goal is to combine basic soil resource

information with good soil monitoring data to help guide management decisions. Field monitoring has been limited but in the past 20 years or more, Custer Gallatin specialists have analyzed or estimated soil conditions based on field assessments supported by a variety of existing information sources such as topographic and geology maps, aerial photography, satellite imagery, climate models, and most recently, terrain analysis. These resources have helped soil specialists to prioritize soil improvement efforts, including when to actively restore habitat conditions and when to let nature take its course.

In 2009, national forest soil scientists began using an approach called the Forest Soil Disturbance Monitoring Protocol. This method, which uses visual indicators to describe surface conditions, helps improve consistency in the assessment of soil disturbance impacts. Increased use of this system and continued advances based on best available science will help improve knowledge and awareness of the Custer Gallatin's soil resources and conditions. Based on this analysis, following are soil conditions for the five landscape areas on the Custer Gallatin National Forest.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains. Soil productivity in this area varies strongly with the terrain. Conditions are generally cold and dry, with limited soil depth on rocky slopes. In most years, low temperatures limit growth in early spring while dry conditions limit growth during the late summer and early fall. With about 74 percent of this landscape area designated as wilderness or roadless areas, the soil is mostly undisturbed except for a few areas of recreational use. Soil disturbance from past timber harvest activities can be found on portions of the obsidian sand plain in the West Yellowstone area and the headwaters of Little Tepee Creek, north of Hebgen Lake. Off-road vehicle use and user-created trails have also degraded soil in several areas, including the Beartooth District's Benbow area. Past mining impacts can still be seen in several locations.

Bridger, Bangtail and Crazy Mountains. Soil productivity here is also highly variable due to factors such as diverse terrain and complex patterns of natural soil erosion and deposition. For example, while there is limited topsoil in steep, rocky areas, downwind deposition of sediment on the northeast side of the Bridgers has resulted in deep soils that greatly increase overall soil productivity. About 40 percent of this landscape area is in designated roadless areas, which means soil disturbance levels in that portion are generally low. However, some of the areas that were privately owned when harvested currently have lower levels of soil productivity due to soil disturbance. This is especially noticeable on the east side of the Bridger Mountains and in parts of the Bangtail Mountains. Additional soil monitoring needs to be conducted in these areas. Invasive weeds, off-road vehicle use and user-created trails have also degraded soil in several areas, including the Bangtail Mountains and Flathead Pass.

Pryor Mountains. Soil productivity in this area is limited by rocky, shallow soils and dry weather most years during late summer and early fall. Although timber harvesting has not occurred since the 1980s, nearly all of this area has been used for cattle grazing. Soil monitoring has been limited in this area, so the full extent of soil disturbance is unknown. Some areas have soil damage, mainly soil compaction and erosion, caused by livestock and likely wild horse grazing as well as other activities.

Ashland and Sioux Districts. Soil productivity on these two districts ranges from low to moderate, with most areas having limited soil moisture as the primary factor restricting plant growth. Wildfires are relatively common. Extensive grazing and timber harvesting have affected soil conditions, though the magnitude and extent of these changes are unknown.

Providing adequate time for the soil to recover is an ongoing challenge. The Riley Pass abandoned uranium mine is a site on the Sioux District where soil reclamation efforts are underway.

Looking Forward: Conclusions and Concerns

While the Custer and Gallatin forest plans of the 1980s contained goals and objectives for land and soil protection, both plans are limited in terms of management direction. With the development of a new plan, national forest managers have the opportunity to create broader and more definitive soil goals and policies.

Although Custer Gallatin soil characteristics and quality have been inventoried over the years, the information is based on a wide variety of observational approaches and much of the information was collected more than 30 years ago. In addition, direct soil monitoring has been limited, especially in the Absaroka-Beartooth Wilderness and parts of the Beartooth District. As a result, there is room for continued study and improvement in terms of consistency and detail. Standardized soil monitoring procedures and modern mapping tools can help Custer Gallatin specialists better understand how soils are affected by disturbance and how national forest soils and related habitats have changed over time.

Additional Information

Additional detail can be obtained by contacting the Custer Gallatin forest plan revision team leader in Bozeman to request a copy of the following document:

Keck, T. et al. 2016. Assessment for Forest Plan Revision - Soils Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802

Air Quality

"For me, a landscape does not exist in its own right, since its appearance changes at every moment; but the surrounding atmosphere brings it to life. For me, it is only the surrounding atmosphere which gives subjects their true value."

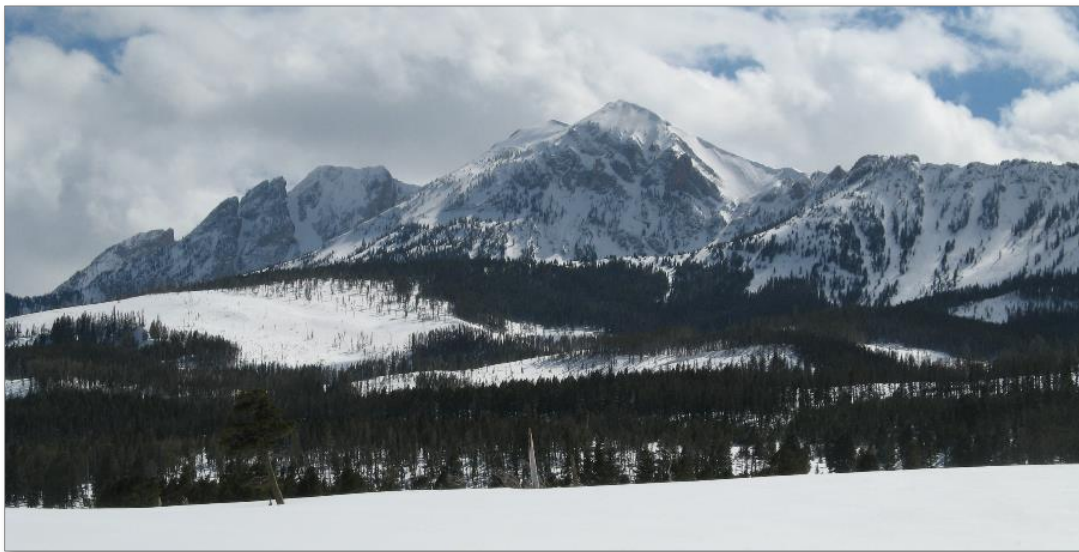
- Claude Monet

Mountains, Lakes, Wildlife and ... Air

When people think of the Custer Gallatin National Forest, they're most likely to think about activities such as hiking, hunting, mountain biking and skiing, or perhaps the mountains, lakes and rivers, or about the fish and wildlife. Yet the Custer Gallatin is in Big Sky country, and clean air is part of the overall experience. While many people don't think about air unless they can see haze or smell smoke, clean air is a vital natural resource. Air provides life to nearly all living organisms, and airborne pollutants can harm water quality and change how ecosystems function.

Forest Service Responsibilities

To comply with State and Federal air quality standards, Custer Gallatin specialists are required to evaluate air quality conditions. These standards, which were designed to protect public health and welfare (including national resources), include regulations related to seven key pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (solid and liquid particles suspended in the air), fine particulate matter and sulfur dioxide.



Clean air not only enhances beautiful scenery like that found in the northern Bridger Mountains, it's also essential for healthy ecosystems

In wilderness areas, the Forest Service is also required to monitor designated natural resources that are known to be sensitive to air pollution. These sensitive natural resources, referred to as "air quality related values," include alpine lakes, snowpack, precipitation and

lichens. To evaluate air pollution impact in these areas, Custer Gallatin specialists are working to identify “critical loads,” which are the maximum amount of pollutants that ecosystems can tolerate without being damaged. Additional information on Custer Gallatin critical loads can be found in the specialist report cited at the end of this section.

Addressing Air Pollution

If air quality downwind from the Custer Gallatin does not comply with State or Federal air quality standards and the Custer Gallatin is found to be a source for the pollution, Custer Gallatin managers are required to reduce the air pollution and may be fined for the violation. Likewise, if Custer Gallatin air quality does not comply with standards because of air pollution from upwind, then the source of that pollution must be identified and addressed by one of the regulatory agencies. This process is often complicated, partly because air pollution effects on landscapes sometimes accumulate gradually.

Local Air Quality Classifications

For air quality monitoring purposes, the Clean Air Act classifies different areas in terms of their “airsheds.” Class I airsheds include most national parks, wilderness areas greater than 5,000 acres and designated before 1977, and designated tribal land. Under the Clean Air Act, Class I airsheds have the highest degree of protection: Little to no degradation to air quality related values is acceptable.

The entire Custer Gallatin is classified as Class II. Under the Clean Air Act, Class II areas may receive a greater amount of human-caused pollution than Class I areas. However, the Lee Metcalf and Absaroka-Beartooth Wilderness Areas are protected by the Wilderness Act, which grants protection to sensitive air quality related values.

Partnering for Healthy Air

On the Custer Gallatin, Forest Service experts work closely with several organizations to assess and protect air quality. For example, air quality monitoring (including periodic checks on visibility, precipitation and snowpack) is done by a variety of Federal, State and local agencies and organizations.

In addition, the Custer Gallatin is a member of the Montana/Idaho Airshed Group, which implements a smoke management plan for these two states. As a member of this organization, Custer Gallatin managers submit prescribed burn requests to the Smoke Management Unit in Missoula. The Unit reviews, coordinates and approves prescribed burning activities with a goal of allowing fire to function in its natural role while still meeting air quality standards. Despite these efforts, there can be temporary spikes in localized air pollution.



Reducing the risk of large wildfires like this through prescribed burning helps limit potential smoke impacts

First, the Good News ...

The Environmental Protection Agency requires State and local air agencies to comply with the Clean Air Act and national ambient air quality standards. If there are repeated violations in a particular location or region, that area is typically categorized as a “nonattainment” area. As of September 2016, no part of the Custer Gallatin was designated as a nonattainment area. (The closest nonattainment areas to the Custer Gallatin are the town of Lame Deer and the Billings and Laurel areas.) In addition, average haze levels and deposition from sulfur pollution in the Greater Yellowstone Area (excluding smoke from fire) have decreased in recent years. (Deposition is the process in which substances are deposited onto land.)

While not yet exceeding State or national standards, rising nitrogen levels are a concern.

However, two Montana monitoring stations near the Custer Gallatin—one at Tower Fall waterfall in Yellowstone National Park (location “WY08”) and the other at Little Bighorn Battlefield National Monument (location “MT00”)—found rising levels of nitrogen, mostly from ammonium in rain and snow samples. These results are shown in the following graphs, in which the data lines show a three-year average. Although there was incomplete data in a few years (shown by the red diamonds), the trends show increasing levels of nitrogen.

This increase in nitrogen deposition may be related to increased use of synthetic fertilizer and concentrated animal feeding operation sites located west of Montana, such as the Snake River Plain in Idaho. Rising nitrogen levels are a concern because they can increase the ability of noxious weeds to thrive, harm sensitive native plant habitat and upset the chemical balance of lakes and streams, especially in sensitive, high-elevation ecosystems. Excess nitrogen in lakes can lead to algae blooms and damage native fish habitat.

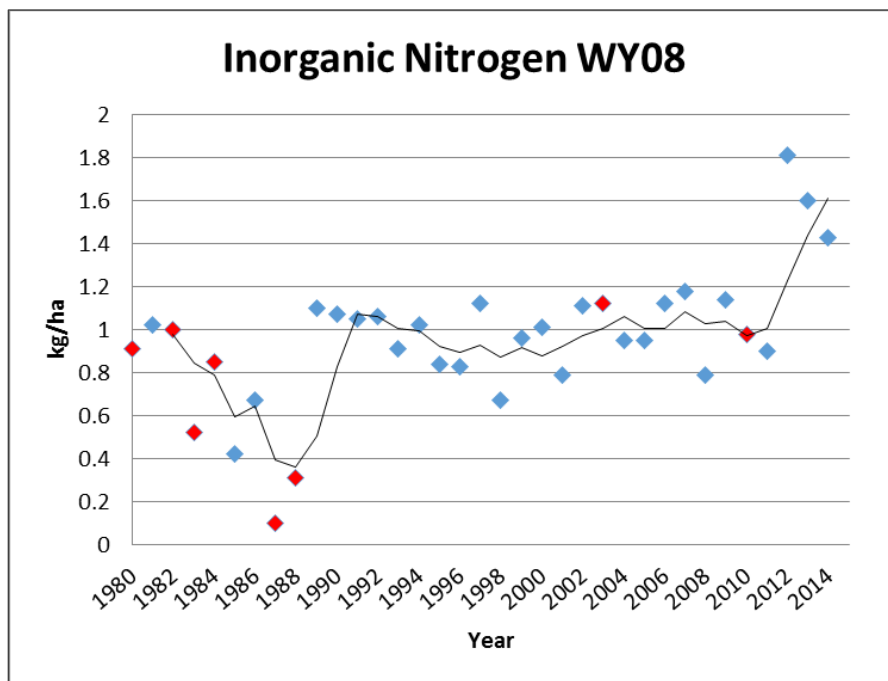


Figure 2. Inorganic wet nitrogen deposition at Tower Fall in northwest Wyoming (data source: National Atmospheric Deposition Program)

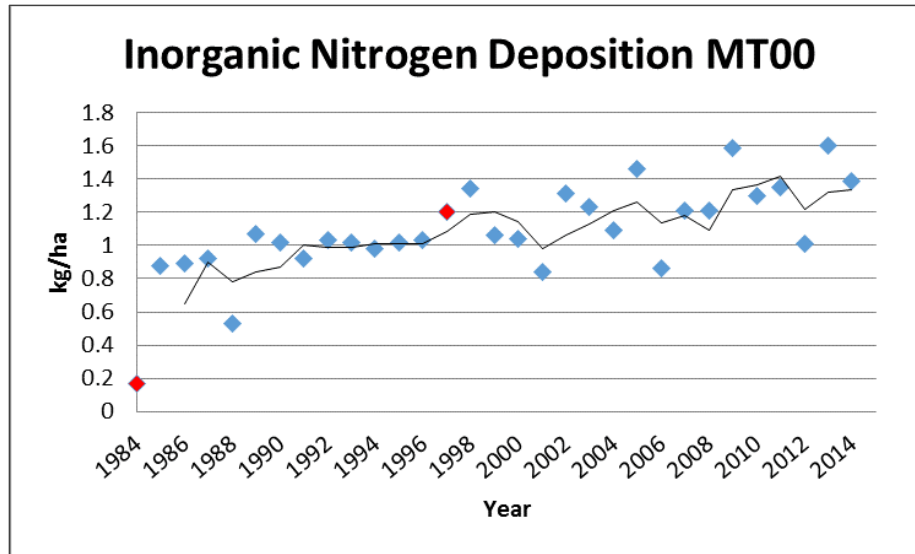


Figure 3. Inorganic wet nitrogen deposition at Little Bighorn Battlefield National Monument in Montana (data source: National Atmospheric Deposition Program)

Other localized areas on or near the Custer Gallatin have been found to have elevated levels of other pollutants. These areas are being monitored to determine whether the pollutants are an environmental concern.

Looking Forward: Conclusions and Concerns

National Forest land managers have a continuing legal responsibility to monitor for compliance with State and national air quality standards. There are two local air quality issues that bear watching: The first is rising nitrogen levels, which may be coming from agricultural operations west or southwest of Montana. The other issue is smoke from wildland fires, which has a temporary effect on air quality. Because fire is a natural part of the ecological process, Custer Gallatin managers may choose to start a prescribed burn or to let a naturally occurring wildfire burn. These decisions are made with consideration to protect lives, property and air quality. Looking forward, specialists will need to continue and expand research to get a more complete evaluation of air pollution on and from the Custer Gallatin, as well as to find out how National Forest ecosystems are being affected by current conditions.

Additional Information

McMurray, J. 2016. Assessment for Forest Plan Revision – Air Quality Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Aquatic, Watershed and Riparian Ecosystems

*"We must begin thinking like a river
if we are to leave a legacy of beauty and life for future generations."
- David Brower*

Environmental Diversity and Surprises

As a national forest that sprawls across more than 3 million acres and seven ranger districts, the Custer Gallatin has one of the most diverse landscapes of any national forest in the continental United States. The Custer Gallatin's aquatic and riparian (streamside) ecosystems are no exception—they have far more variety than just the "postcard" aquatic settings such as the West Gallatin River, with its class IV whitewater runs, iconic trout fishing and inspiring scenery.

For example, the Custer Gallatin is also home to Devil's Canyon in South Dakota, where warm prairie streams wind through the ponderosa pine savanna and provide homes to beavers and a wide variety of plants and animals. Earlier this year, biologists were able to add Iowa darters to this list. A member of the perch family, this fish was previously undocumented in this part of South Dakota.

The Custer Gallatin has the broadest diversity of aquatic and riparian ecosystems and species in the Forest Service's entire Northern Region.

Hundreds of miles to the west—and thousands of feet higher—lies Frosty Lake, which is part of the Beartooth high-mountain lake system in Montana. Located in alpine tundra nearly 11,000 feet above sea level, Frosty Lake's rugged setting and extreme weather make this site appear much less biologically diverse. Yet earlier this year, researchers confirmed that the lake is home to stoneflies that have adapted to living in frigid glacial meltwater.

What do Devil's Canyon and Frosty Lake have in common? Certainly not much from a visual or ecological perspective. But both areas continue to provide environmental knowledge and surprises, even after decades of Federal management and protection. These two sites also serve as a reminder that the Custer Gallatin has the broadest diversity of aquatic and riparian ecosystems and species in the Forest Service's entire Northern Region, which covers 25 million acres across five states.



Devils Canyon fish habitat in the Sioux District

What Are Aquatic and Riparian Ecosystems?

Ecosystems are typically defined as a biological community of interacting organisms and their physical environment. When the words “aquatic” and “riparian” are added, the term can apply to three ecosystem types: surface water (such as ponds, lakes, rivers, streams and wetlands), groundwater (water held underwater, such as in soil or in rock crevices), and transitional areas such as land adjacent to and dependent on a river or stream.

While rivers and other waterbodies on the Custer Gallatin tend to get a lot of notice from visitors and researchers, groundwater and riparian areas have not received the same level of attention. Yet groundwater and riparian ecosystems are vitally important. According to the Natural Resource Information Service, groundwater provides 94 percent of Montana’s rural domestic water supply and 39 percent of the state’s public water supply.

Riparian systems also tend to support a much wider range of plant and animal species than most other types of ecosystems. Together, surface water, groundwater, and riparian ecosystems affect not only the health of plants and animals, but also many social and economic factors such as scenery, recreation, and residential and business water supply. For example, the Custer Gallatin provides municipal water supply to Red Lodge, West Yellowstone, and Bozeman, while the national forest’s streams and groundwater feed into local rivers.



The Absaroka-Beartooth Wilderness includes alpine wilderness, snowfields, lakes and streams

Evaluating Watersheds on the Custer Gallatin

Watersheds are defined as areas of land on which the surface water and groundwater drain into a single larger body of water. To help evaluate environmental conditions and prioritize watershed restoration efforts, the Forest Service uses a standardized process called the Watershed Condition Framework.

As part of this process, every watershed that is at least 5 percent national forest land is evaluated in terms of environmental factors such as water quantity and quality, aquatic and land habitat conditions, plants and animals, soil conditions, roads and trails, fire condition, forest cover, and disrupting factors such as invasive species, insects and diseases. Custer Gallatin hydrologists and aquatic specialists use a variety of approaches to monitor aquatic and riparian health, including site monitoring, vegetation mapping, and species distribution information from Federal and State agencies. Based on findings, the watersheds are classified as “functioning properly,” “functioning at risk” or “impaired function.”

For the past few years, staff on the Custer Gallatin have used this approach to help prioritize restoration efforts. As the two maps below show, most Custer Gallatin watersheds have been classified as functioning properly. While several areas are considered to be functioning at risk, none are classified as impaired function.

Most Custer Gallatin watersheds have been classified as functioning properly.

Each of the areas classified as functioning at risk has specific reasons for its classification, but a few common factors are worth mentioning. On the Custer Gallatin’s montane landscape areas, the most usual reasons for a decrease in watershed condition are a lack of road and trail maintenance, a decreasing presence of native species, an increasing presence of invasive species, and water quality issues. In the pine savanna areas, reduced watershed conditions are often related to changes in stream flow and stream channel shape or function, fragmented aquatic habitats (generally caused by roads or dams), deteriorating riparian vegetation, grazing practices, and a high proportion of roads relative to land area.

Partly based on these findings, Custer Gallatin aquatic and riparian specialists have developed several watershed restoration action plans to address watershed issues in priority locations. Two of these plans have been completed and three others are being implemented.

Water Rights and Other Considerations

One thing that complicates aquatic management on the Custer Gallatin National Forest is the issue of water rights. More than 5,400 private agricultural and residential water rights are held on aquatic diversion points on the national forest. Custer Gallatin land managers work with local property owners to protect water supply and restore habitat and native species. The Custer Gallatin also has an agreement with the State of Montana to acquire water rights on National Forest System lands when available and necessary for the benefit of aquatic ecosystems.

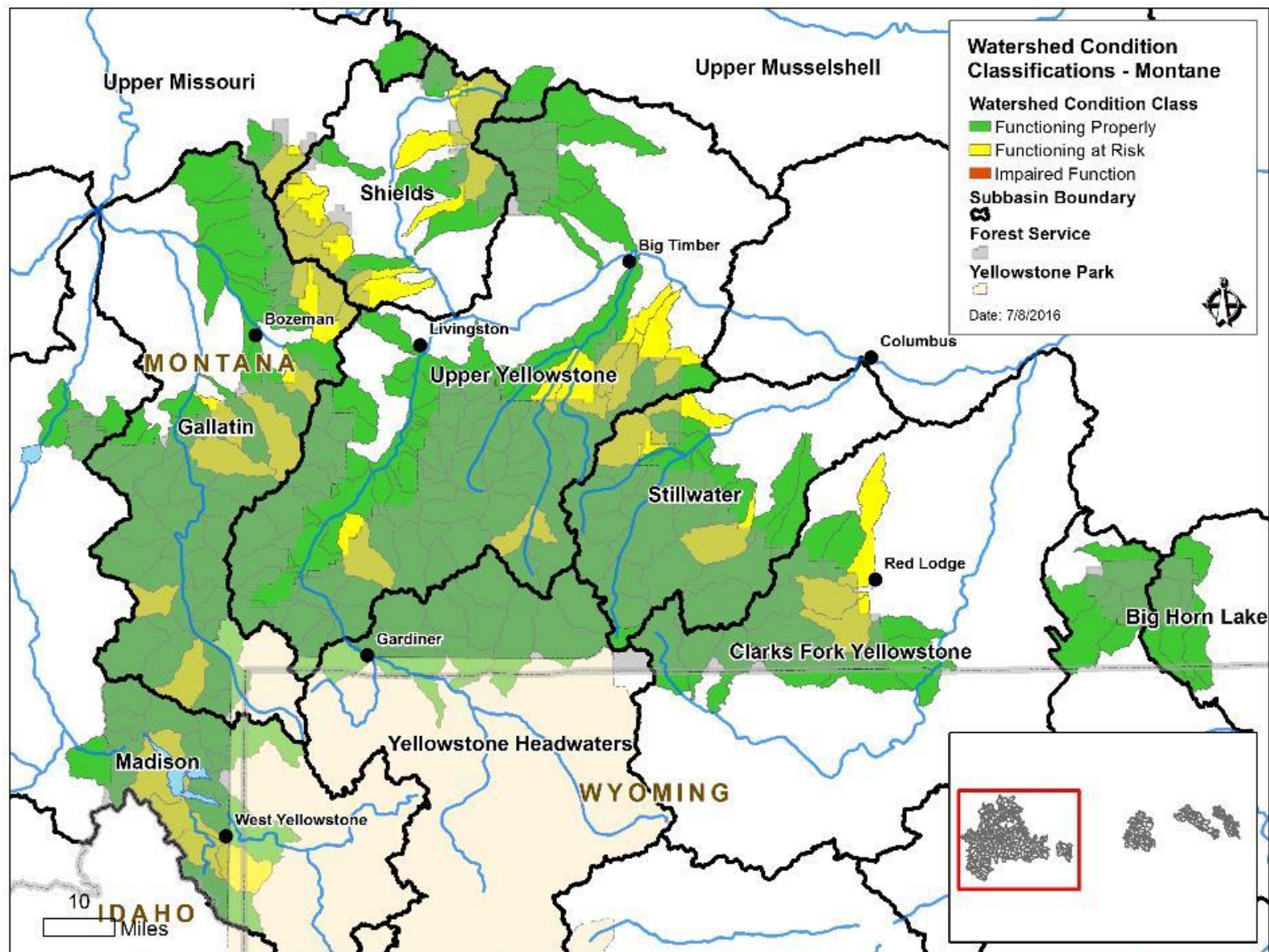


Figure 4. Custer Gallatin watersheds and condition class ratings on the west side of the national forest

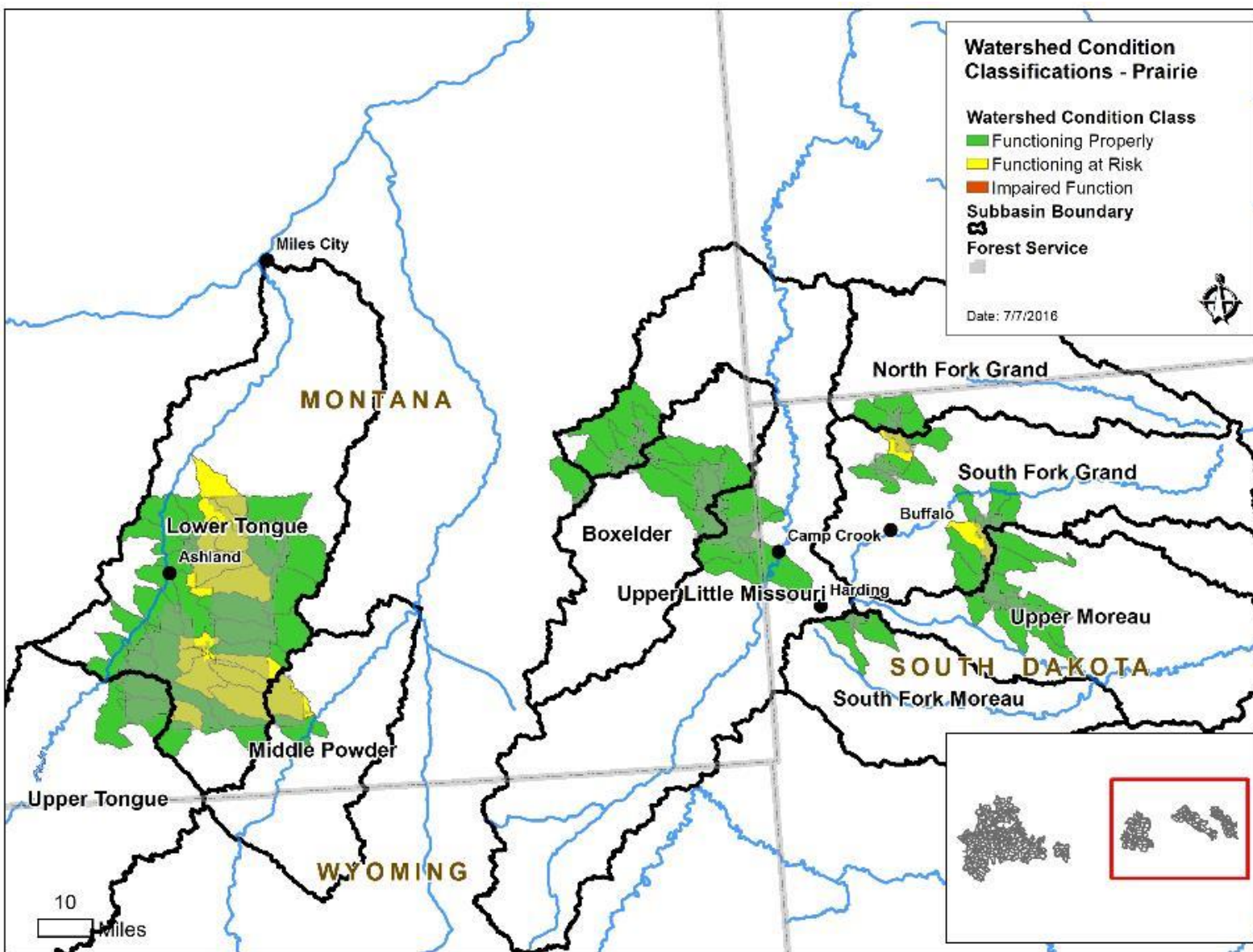


Figure 5. Custer Gallatin watersheds and condition class ratings on the east side of the national forest

Other factors that Custer Gallatin aquatic specialists must consider when managing aquatic ecosystems are the wide variety of other national forest priorities, including recreation, livestock, timber harvesting, roads, trails, mining, reservoirs, invasive species, and protection of natural habitat and wildlife. Climate change is another issue of concern, but one that will likely affect species, habitat, and water management on a wider scale. In other words, management activities may need to change if precipitation frequency or amounts change significantly. And because of its location and land management policies, the Custer Gallatin may become a refugia—a habitat for native species such as cutthroat trout that become scarce or extinct elsewhere due to climate change and other factors. In the meantime, water demands may rise with Montana's population, which the State Commerce Department expects will grow more than 14 percent from 2013 to 2043.

Species to Watch

In the future, several aquatic and riparian species on the Custer Gallatin National Forest may factor into management decisions. For example, one of the Custer Gallatin's main focuses in the past decade has been native trout conservation. With the cooperation of interagency partners, westslope and Yellowstone cutthroat trout have been restored to more than 140 miles of rivers within the national forest. This effort will likely continue in the next decade.



The Yellowstone cutthroat trout is an iconic species found on the Custer Gallatin

Along with westslope and Yellowstone cutthroat trout, four other native species have been identified by Custer Gallatin staff as “potential species of conservation concern”—a term that applies to native species that are not included in Federal categories but have declining populations, habitat threats, restricted habitat range, or other factors of concern and for which the best available scientific information indicates substantial concern about the species' capability to persist over the long term in the plan area. These other native species are the Arctic grayling, western toad, Gallatin mountainsnail and western pearlshell. The Regional Forester determines the final list of species of conservation concern. (A list of species that were evaluated but are not identified as potential species of conservation concern by Custer Gallatin staff can be found in the specialist report listed at the end of this section.)

Beavers also may receive special consideration, partly because beaver ponds can help maintain groundwater levels, reduce flooding and provide habitat for a wide variety of species.

Nonnative invasive species on the Custer Gallatin present a constant challenge to managers. Invasive aquatic species include rainbow trout, brown trout, brook trout, curly-leaf pondweed, New Zealand mudsnails and American bullfrog. In riparian areas, invasive plant species include tamarisk, leafy spurge, Canada thistle, houndstongue, oxeye daisy and tall buttercup. However, the biggest invasive species priority is preventing encroachment by new invasive species. This will likely become more difficult as a warming climate increases the number of potential invaders.



A fish barrier prevents upstream movement of nonnative fish on Sixteen Mile Creek

Locations to Watch: A Few Examples

The Custer Gallatin includes several sites or regions where past use and changing habitat have increased the need for assessment and monitoring. A few examples are listed below.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains

Yellowstone River. The recent deaths of thousands of Yellowstone River mountain whitefish have been traced to a microscopic parasite that thrives in slow, warm water—conditions that are associated with climate change. In addition, habitat changes and nonnative fish species may have caused reductions in cutthroat trout populations here and in other rivers, including the Madison and Gallatin Rivers.

Emigrant Creek Drainage Area in the Absaroka-Beartooth Wilderness. Through a combination of natural conditions and past mining activity, surface water and groundwater in this area have been affected by elevated iron levels. A 2015 study found no fish in Emigrant Creek.

Ashland and Sioux Ranger Districts

Pine Savanna Stream Restoration in the Ashland and Sioux Districts. Aquatic and riparian restoration work in these districts may include connecting fragment habitats, returning water to stream channels, and restoring riparian zones.

Riley Pass Abandoned Uranium Mine in the North Cave Hills Area. Located on a 250-acre site on the Sioux District, about 25 miles east of Buffalo, South Dakota, Riley Pass is the site of uranium strip mining that started in 1954. This area is undergoing a cleanup effort supervised by the Forest Service, the Environmental Protection Agency and the State of South Dakota. This effort will require completely rebuilt watersheds and streams, in some locations.

Powder River Basin, next to the Ashland District. The Powder River Basin underwent a significant increase in coal bed methane drilling and development in the first decade of this century. Drilling activity peaked in 2008 with approximately 700 wells but that number has fallen to about 90 wells. Although coal bed methane development uses large volumes of groundwater to release methane gas, Ashland District monitoring has not yet found changes to groundwater table depth or quality.

Key Findings and Conclusions

If report cards were issued for national forests, the Custer Gallatin's watersheds would likely receive well over a passing grade. Most of the Custer Gallatin's watersheds are fully functioning, none are nonfunctioning, and most native aquatic species are still present. However, invasive species, climate change and past human activity across the national forest have resulted in several areas of concern, and certain species are not as widespread or as prevalent as they used to be. Continued research and monitoring is needed, and certain species and locations will require new or continued management actions.

As Custer Gallatin managers work toward a revised forest plan, they have several goals. One is to improve consistency between the individual Custer and Gallatin forest plans from the 1980s. Another is to evaluate areas where past use or events such as grazing, timber harvesting, mining, fire, or tree diseases may have changed aquatic ecosystems. By better understanding ecosystem responses to changing conditions and other issues, Custer Gallatin managers will be better able to devise management strategies for the National Forest and its aquatic resources.

Additional Information

Barndt, S., K. Reid, and J. Chaffin. 2016. Assessment for Forest Plan Revision - Aquatic and Riparian Ecosystems Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Other resources for this section include:

Montana Fish, Wildlife and Parks. 2016a. Montana Fisheries Information System website.

fwp.mt.gov/fishing/searches/mFish.

Montana Fish, Wildlife, and Parks. 2016b. Aquatic Invasive Species website.

fwp.mt.gov/fishAndWildlife/species/ais/speciesId/default.html.

Montana Natural Heritage Program. 2016. Natural Heritage Tracker website. www.mnhp.org.

Montana Natural Heritage Program. 2016. National Wetland Inventory. mntnhp.org/nwi.

South Dakota Department of Game, Fish and Parks. 2014. South Dakota wildlife action plan. Wildlife Division Report 2014-03. Pierre, SD. 583 pp.

U.S. Department of Agriculture, Forest Service. 2011. Watershed condition technical guide. FS-978. Washington, DC. 49 pp.

Terrestrial Vegetation Ecosystems and Species

*“No part of the world can be truly understood
without a knowledge of its garment of vegetation,
for this determines not only the nature of the animal inhabitants
but also the occupations of the majority of human beings.”*
- Ellsworth Huntington

A Deeper Meaning

Ponderosa pine trees, which are found on the eastern part of the Custer Gallatin, have an interesting history. Even before explorers Lewis and Clark saw the tree itself, they marveled at its massive cones floating down the Missouri River in South Dakota. Later, pioneers used the tree's wood to build homes, telegraph poles and railroad ties. In 1908, Montana school children picked the tree as their choice for a state tree; 41 years later, the State legislature made it official.

But before Europeans made their way westward across the continent, Native American tribes had their own view of ponderosa pines and pine trees in general. Some saw pines as a symbol of longevity; others said they represented wisdom and harmony with nature. Others burned pine cones in hopes of changing the weather to be more favorable.



Autumn colors brighten a Custer Gallatin mountainside (photo courtesy of Terry Jones)

For many of us, trees and other vegetation may represent a resource to be used, appreciated in a general sense, and perhaps protected. In these days of “ecosystem stressors” such as changing weather patterns, larger wildfires and wide-ranging tree die-offs,

these values are worth considering as the Forest Service balances goals for vegetation biodiversity and resiliency with demand for various land uses.

Social, Environmental and Economic Benefits

In addition to their cultural significance, trees and other vegetation on the Custer Gallatin provide a wide range of social, environmental and economic benefits. These include scenic and recreational value, wildlife habitat, grazing, and contributions to the overall economy through clean water, tourism, employment and forest products. Maintaining and enhancing these functions is an integral part of sustainable vegetation management. But while the importance of vegetation is clear, management challenges have increased in recent decades as a result of factors such as increased public use, climate warming, invasive species, insects, disease and past management decisions related to fire suppression, grazing and other land uses.

Landscape Areas

The vast landscapes that make up the Custer Gallatin National Forest provide a wide variety of plant communities. These communities are in a constant state of change, influenced by factors such as natural succession, human use, wildfire, insects, disease and climate change.

The Custer Gallatin assessment process is based on five landscape areas—three montane (mountainous) areas and two pine savanna areas—each of which is described below. As Figure 6 and Figure 7 show on the next page, the pine savanna areas (the Ashland and Sioux Districts) have a higher proportion of nonforested landscape while the montane areas have a higher proportion of forested landscape.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains

This landscape, which includes four distinct mountain ranges and a small part of the Henrys Lake Mountains, makes up nearly 70 percent of the national forest. Vegetation includes alpine ridges, mountain peaks, cirques, moraines, tundra plateaus, coniferous forests (mainly cone-bearing trees), meadows and foothill grasslands. The overall landscape is about 70 percent forested; the rest is a mix of shrubs, grasses, forbs, and sparsely covered or nonvegetated areas.

Bridger, Bangtail and Crazy Mountains

This landscape area consists of three mountain ranges located north and northwest of Interstate Highway 90. The vegetation is mainly coniferous forests, meadows and foothill grasslands. The patchy coniferous forests are dominated by Douglas-fir and lodgepole pine. On the east side at higher elevations, Engelmann spruce and subalpine fir forests are common, while the highest elevations in the range support alpine vegetation. The area is about 70 percent forested, with the rest a mix of shrubs, grasses, forbs and sparsely covered or nonvegetated areas. Land management is complicated by a checkerboard pattern of national forest and privately owned land.

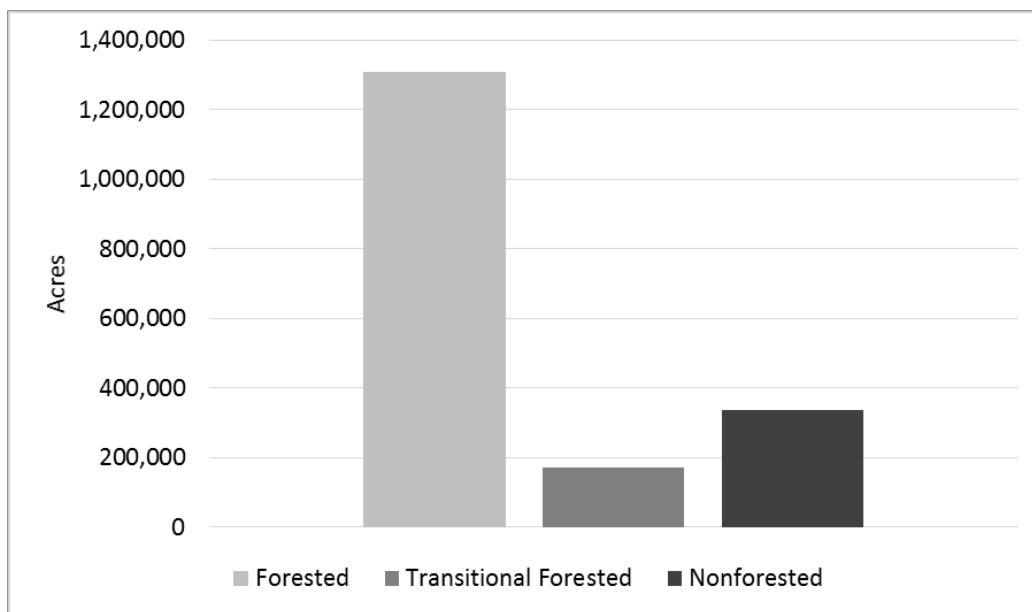


Figure 6. Forested, transitional forested and nonforested areas on the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area

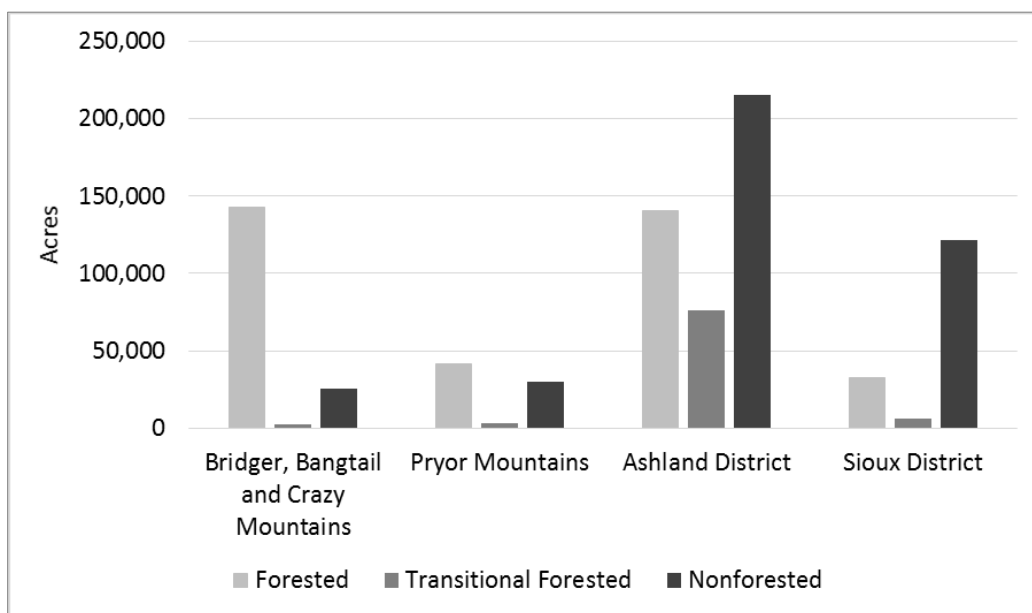


Figure 7. Forested, transitional forested and nonforested areas on the Bridger, Bangtail and Crazy Mountains; Pryor Mountains; Ashland District, and Sioux District landscape areas

Pryor Mountains

Located south of Billings, this is the easternmost montane ecosystem on the Custer Gallatin. The setting is mainly subalpine meadows and ridges, montane coniferous forests, meadows, foothill grasslands and semi-desert. The area is about 60 percent forested, with the rest a mix of shrubs, grasses, forbs and sparsely covered or nonvegetated areas. Three distinct plant regions come together here, making this an area of exceptional diversity. More than 400 plant species can be found here, including many that can only be found in this region.

Ashland District

The Ashland District, located east of the Pryor Mountains in Montana, has mainly a pine savanna ecosystem. The area has sandstone cliffs, ponderosa pines and grasslands with ravines and ridges. The vegetation includes dense ponderosa pine tree stands, green ash woodlands, sagebrush and open, grassy uplands. About 50 percent of the area has the potential to be forested but because of recent fires, forest cover is only 27 percent. The rest is a mix of shrubs, grasses, forbs and sparsely covered or nonvegetated areas. More than 470 plant species can be found here.

Sioux District

Located at the eastern end of the Custer Gallatin, the Sioux District also has a pine savanna ecosystem. Sparse or nonvegetated area is the main landscape type, followed by forests, grasses, forbs and shrubs. About 550 plant species can be found here. This area contains eight separate land units—three in Carter County, Montana and the rest in Harding County, South Dakota. These units are separated by state highways and privately owned lowland properties—mostly ranchland and agricultural areas, but some with native grassland areas.

Management Evaluation Process

One important part of the vegetation assessment process is an evaluation of “ecosystem integrity,” which is whether ecological conditions are within the natural range of variation and can withstand and recover from most disturbances (like fires, insect attacks or wind storms). Natural range of variation can be defined as the range of natural conditions and processes in a specific area over a certain period of time. Custer Gallatin specialists use a 1,000-year timeframe. Custer Gallatin specialists are in the process of evaluating whether current conditions in each ecosystem have ecological integrity.

Following are key ecosystem characteristics that are used to evaluate ecosystem integrity:

- fire
- insects
- invasive species
- old growth
- patch size and configuration
- rare communities
- snags (standing dead trees)
- special habitats
- vegetation diversity
- vegetation management activities
- vegetation structure and composition
- woody debris (down dead vegetation)

Management Challenges and Concerns

Custer Gallatin managers face a multitude of challenges and areas of concern related to vegetation. Several of these are described below.

Aspen Groves. Aspen trees are valued for their contribution to biodiversity and habitat. Historically, natural wildfires helped aspen by removing the shade of taller trees, killing encroaching conifer trees and stimulating new sucker growth from aspen root systems. There are about 12,100 acres of aspen on the Custer Gallatin. This is less than it was historically because of habitat changes from grazing and fire suppression.

Climate Change. A warmer climate has had many effects, both directly and indirectly. For example, it has reduced the severity of cold weather that has historically kept bark beetle populations in check. In some areas, a warming climate may cause vegetation types in certain areas to “transition” (when one or more species is replaced by one or more other species). Other predicted effects include more severe or frequent wildfires.

Conifer Spread. Over time, conifers can spread onto land that was historically dominated by sagebrush or grasses. This can result from climate change, fire suppression and grazing. Conifer spread can change soil properties, watershed characteristics, the mix of vegetation and the types of wildfires that occur.

Fire Suppression. Fire suppression has contributed to increased vegetation density and woody debris buildup, which can lead to severe fires that kill most of the vegetation in an area. Fire suppression also interferes with the natural transition of one plant type to another over time.

Forest Cover Reduction. Forest cover amounts have been reduced in some areas as a result of recent large-scale wildfires. This has affected vegetation and watersheds. Cover for wildlife has been reduced, natural regeneration rates have been delayed and re-burn risk has increased.

Green Ash Woodlands. Located in relatively moist areas of eastern Montana and the northern Great Plains, green ash woodlands are able to support a larger volume of life than the surrounding grassland and shrubland vegetation. During much of the year, these places are islands of trees and shrubs surrounded by dry steppe vegetation. Green ash woodlands attract wildlife and livestock for shade, nesting, moisture, food and hiding cover. There are about 11,400 acres of green ash woodlands on the Ashland and Sioux Districts.

Homogeneity (patch size and configuration). Forested areas generally transition and diversify over time, if left alone. But severe fires, invasive species, fire suppression and other actions can interfere with natural vegetation transitions, resulting in “structural homogeneity,” or a lack of species diversity. When this occurs, habitat disruption can be relatively intense, widespread and complete.

Insects, Diseases and Parasites. Insects, diseases and parasites play many important roles related to vegetation. However, in some cases climate warming and previous management activities have reduced the environmental controls that prevented widespread outbreaks. Following are some of the insects and parasites found on the Custer Gallatin.

- **Douglas-fir Beetles.** These native bark beetles have attacked Douglas-fir across the Forest Service's Northern Region (from north Idaho across Montana and into the Dakotas).
- **Dwarf Mistletoes.** This common native parasitic plant extracts water and nutrients from host plants such as lodgepole pine, causing the tree to weaken and sometimes succumb to insects, disease or other stressors. One common symptom is a "witches' broom," a dense mass of distorted branches that some trees form in response to infection.
- **Mountain Pine Beetles.** These native bark beetles are capable of killing wide areas of pine forests, especially during warmer-than-normal conditions. While outbreaks in the national forest have been less severe than those reported in other nearby national forests, continued warming trends may result in similar outbreaks on the Custer Gallatin.
- **Western Spruce Budworms.** The most widely distributed defoliator (leaf destroyer) in the western United States, these native budworms eat the needles, cones and seeds of spruce, Douglas-fir, subalpine fir, and sometimes pine. Outbreak cycles appear to be getting longer.
- **White Pine Blister Rust.** White pine blister rust infects and kills five-needled pines, including limber and whitebark. Blister rust is nonnative, widespread and increasing in frequency and severity.

Invasive Species and Noxious Weeds. Noxious weeds are species that can harm landscapes, generally by displacing native species. These "invasions" often follow human use, as tires and shoe treads can carry nonnative seeds. Recreation, mining, grazing and other land uses can also leave bare areas that invasive species can easily dominate. Wind and wildlife can also contribute to invasive species establishment. There are at least 33 invasive species on the Custer Gallatin, including spotted knapweed, leafy spurge, toadflax and hawkweed. Invasive species acreage on the Custer Gallatin is believed to have increased in recent years. The Custer and Gallatin forest plans outline pest management programs to control noxious weeds and to work with other agencies and neighboring land owners to control weeds.

There are at least 33 invasive species on the Custer Gallatin, including spotted knapweed, leafy spurge, toadflax and hawkweed.

Snags and Woody Debris. Dead standing trees, or snags, have high habitat value because they provide homes for wildlife in hollow cavities and insect food for a variety of birds. Woody debris that falls to the ground also provides soil and microbe benefits as it decays. Although snags and woody debris are beneficial in moderate amounts, they can increase fire severity if they build up.

Whitebark Pine. Whitebark pine is considered a "keystone species," which means that many other species rely on it. For example, whitebark pine is often the first tree to grow on high-elevation sites with difficult growing conditions and it has large, protein rich-seeds that are an important food source for birds, squirrels, bears and other species. Present on about 420,000 acres on the Custer Gallatin, this species is at significant risk from white pine blister rust and mountain pine beetles. Whitebark pine is federally listed as a candidate species warranted for potential listing as threatened or endangered.

Wildfire. As a natural part of ecosystem changes, fire influences many environmental factors such as vegetation mix, nutrient recycling, and stimulation of fire-dependent and fire-adapted vegetation. Climate warming, drought, insect infestations and long-term fire suppression are among the conditions that can cause wildfires to be much more severe, resulting in a higher level of destruction and a longer time for burned areas to recover.



The 2006 Derby Fire burned more than 55,000 acres on the Gallatin National Forest

Wildland-urban Interface. The wildland-urban interface is the area where wildlands and human development meet. Having human residences, commercial properties and infrastructure near managed natural lands creates additional considerations when it comes to land management issues such as forest and fuel management and prescribed burning.

Species of Concern

Several native vegetation species have been identified as “potential species of conservation concern,” which means that the best available science indicates substantial concern about the species’ capability to persist over the long term in the plan area. Following is a list of those species. The Regional Forester determines the final list of species of conservation concern.

A list of species that were evaluated but are not identified as potential species of conservation concern by Custer Gallatin staff can be found in the “At-risk and Potential Plant Species of Conservation Concern” specialist report cited at the end of this section.

Annual Indian paintbrush	Muskroot
Barratt’s willow	Narrowleaf milkweed
Beaked spikerush	Narrowleaf penstemon
Beartooth large-flowered goldenweed	Northwestern thelypody
Checker-mallow	Nuttall Desert parsley
Dakota buckwheat	Oval-leaf milkweed
Denseleaf draba	Peculiar moonwort
Dwarf purple monkeyflower	Prairie goldenrod
English sundew	Rockyscree false goldenaster
Frenchman’s Bluff moonwort	Shoshonea
Heavy sedge	Small yellow lady’s-slipper
Hiker’s gentian	Spiny hopsage
Meesia moss	Whitestem goldenbush
	Wooly twinpod



Small yellow lady’s slippers

Vegetation Types

There are many different vegetation types on the Custer Gallatin, several of which are addressed in the Custer and Gallatin forest plans. Major habitat types on the Custer Gallatin are described below. (Unless noted otherwise, each vegetation type can be found on all five landscape areas.)

Broadleaf Woodlands

These relatively moist settings include green ash woodlands and are often found in ravines formed by intermittent and ephemeral streams (streams that do not flow year-round or only during storms). Uplands are generally mixed grass prairies, shrublands and ponderosa pine forest. This habitat can be found on the Ashland and Sioux Districts. Potential stressors include fire suppression, grazing, invasive species, disease, insects, fire, conifer spread and human activity.

Cold Forests

These are high-elevation forests with subalpine fir and lodgepole pine, and sometimes Engelmann spruce and whitebark pine. About 29 percent of the three montane landscape areas are cold-forest vegetation types. Potential stressors include disease, insects, fire and human activity.

Cool, Moist Forests

These forests are mainly found in the mid-elevation range of the montane landscapes. Dominant tree species include Engelmann spruce, subalpine fir, lodgepole pine and Douglas-fir, while dominant shrubs include Sitka alder, mountain maple, huckleberry, gooseberry and thimbleberry. Plants can include forbs, grasses, sedges and rushes. This habitat can be found on the three montane landscape areas on the Custer Gallatin. Potential stressors include fire suppression, disease, insects, fire and human activity. Structural homogeneity is a management concern.

Warm, Dry Forests

Generally ponderosa pine and Douglas-fir forests mixed with grasslands, these areas may also support chokecherry, snowberry, buffaloberry and Rocky Mountain juniper. Montane landscapes are dominated by limber pine, Douglas-fir and lodgepole pine, while the pine savanna landscapes are dominated by ponderosa pine. Grass-dominated areas are generally related to past wildfire, but shrubs and trees are beginning to grow in some of these areas. Past fire suppression in some locations has altered species composition and increased tree density and fuel loads, increasing the likelihood of insect and disease outbreaks and high-severity wildfires. Other potential stressors include invasive species, grazing and human activity.

Grasslands, Meadows and Shrublands

Grasslands. Grasslands are generally dominated by cool-season perennial bunchgrasses and forbs, with few shrubs or trees. Grasslands can include buckwheat, phlox, silky lupine, yarrow, penstemon and sticky geranium. Scattered pockets of ponderosa pine, Douglas fir, limber pine and Rocky Mountain juniper can also occur. Grasslands range in size from small

patches to large, open “parks,” from montane to foothill zones. Potential stressors include conifer spread, fire, invasive species, grazing, drought, off-road vehicle use and other human activity.

Meadows. Moderately moist meadow grassland habitats occur at lower montane to subalpine elevations where soils, snow deposition or windy conditions limit tree growth. These habitats may dry up late in the summer. Meadows are often interspersed with shrublands or forests, or are next to alpine communities across the national forest. Scattered shrubs or trees may also be present. These meadows are often found on the edges of wetter meadows or wooded marshes. Potential stressors include conifer spread, invasive species spread, grazing, drought, off-road vehicle use and water diversion.

Shrublands. Shrublands in dry settings can be found across a wide range of conditions on the Custer Gallatin. Vegetation can vary widely but is typically dominated by mountain or Wyoming big sagebrush and sometimes antelope bitterbrush. Other plants can include perennial bunchgrass and forbs. Shrublands in moist settings include shrubby cinquefoil, snowberry, birch and willow. Potential stressors include conifer spread, fire, invasive species, grazing, drought, off-road vehicle use and other human activity.

Riparian Areas, Wetlands and Aquatic Habitats

Riparian (riverside) systems occur along creeks and rivers, floodplains and similar areas. Vegetation varies widely but is often dominated by trees with many shrubs, forbs, sedges and rushes. Depending on the moisture level, trees can include cottonwood and Engelmann spruce, Douglas-fir and Rocky Mountain juniper. Shrubs can include willow, mountain alder, river birch, dogwood, hawthorn, chokecherry, rose, silver buffaloberry, Rocky Mountain maple and snowberry. Although riparian areas make up only about 3 percent of the montane landscapes and less than 1 percent of the pine savanna landscapes, they are important habitat areas.



Riparian areas make up about 3 percent of the montane landscapes on the Custer Gallatin

Potential stressors to riparian areas include invasive species, grazing, drought, off-road vehicle use and other human activity. Potential stressors to wetlands include development or disturbance from grazing, water diversion and road-building. Established protection includes the use of streamside management zones during tree harvest operations. Additional information on this habitat area can be found in the section entitled “Aquatic, Watershed and Riparian Ecosystems and Species.”

Alpine Areas

Located in high-elevation montane areas, there are about 121,000 acres of alpine vegetation on the Custer Gallatin. Alpine vegetation is dominated by grasses, sedges, small shrubs and forbs that are able to withstand cold soil temperatures, a short growing season, wide temperature fluctuations, low humidity and soil moisture, high winds and ultraviolet radiation. This habitat can be found on the three montane landscape areas on the Custer Gallatin. Potential environmental stressors include climate change and damage from recreational use and trail construction.



Alpine vegetation on the Custer Gallatin

Sparsely Vegetated Areas

These areas are often described as talus, rocky sites, disturbed sites, exposed sites or badlands. They are often located on the edge of other habitats, particularly dry ones. Although recreation and road construction are potential stressors to the sparse vegetation that occurs in these areas, disturbance is often limited due to inaccessibility, especially in the montane landscape areas. Potential stressors in the pine savanna landscape areas include invasive species and off-road vehicle use.

Carbon Stocks

Closely related to vegetation is the issue of “carbon stocks,” which is the amount of carbon stored in the world’s land-based ecosystem—mainly within living vegetation and soil, but also in dead wood and litter. Carbon is a building block of life; it’s present in all living creatures. While carbon is stored beneficially, it is also released as part of carbon dioxide—a key contributor to greenhouse gases, which are considered a major cause of global warming. But there’s almost three times as much carbon in terrestrial ecosystems (land-based biological communities) as there is in the atmosphere.

Forest carbon levels naturally change over time. For example, when they’re in a rapid growth mode, forests may pull more carbon dioxide from the atmosphere than they give off, which may help slow global warming. But when there’s a wildfire, the opposite can happen—forests

can give off more carbon dioxide than they store in the ground, which may accelerate global warming.

The carbon flow process is illustrated in Figure 8.

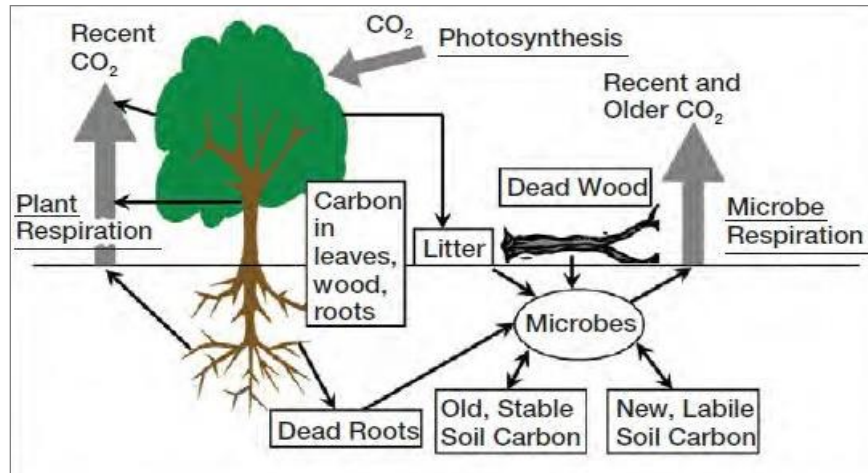


Figure 8. Flows of carbon from the atmosphere to the forest and back
(Source: Ryan et al. 2010)

A recent Forest Service study found that 8 of the 12 national forests in the Northern Region, including the Custer and Gallatin National Forests, stored more carbon than they gave off from 1990 through 2012. However, several factors can accelerate, slow or even reverse this trend. These factors may include removal of live trees from the carbon cycle due to timber harvest, human land development, recent droughts, severe wildfires and insect and disease epidemics. The long-term solution is restoration of forest resiliency using tools such as reforestation and vegetation management, both of which have dropped off in the last 20-plus years.

Management Tools

Tools used to manage vegetation and fuel conditions include timber harvesting, reforestation, prescribed burns and treatment of noxious weeds. Use of these tools has changed over time, partly due to better understanding of their effectiveness in different situations. It has also become more common for more than one management tool to be used on the same site. Use of these management tools across the national forest has declined since the 1990s—generally because of litigation, budget constraints, changing timber market values and other multiple-use tradeoffs. However, on the pine savanna units, stand-improvement activities have recently increased slightly, due to higher timber harvest levels and partner support for restoration and reforestation.

Looking Forward: Conclusions and Concerns

While changing conditions across the Custer Gallatin have affected many national forest resources in one way or another, vegetation changes are among the most obvious. Whether it's a spotted knapweed infestation or a hillside of beetle-killed trees, vegetation is for many people the clearest indicator that certain conditions have changed within our lifetimes. With the drafting of a new Custer Gallatin forest plan, planners have the opportunity to draft a far-

reaching, consistent blueprint that addresses new environmental issues such as climate warming and the plight of whitebark pine.

In pursuit of this goal and to help with future vegetation management, Custer Gallatin specialists would benefit from the following information:

- further analysis of reforestation success levels and reforestation needs;
- better understanding of forest conditions beneath the forest canopy;
- better understanding of the connection between carbon stocks and climate change;
- continued assessment of potential species of conservation concern;
- continued research and analysis of the natural range of variation across the national forest as it relates to vegetation structure and composition, environmental fragmentation, forest openings, disease, vegetation connectivity and intermixing, and other factors;
- continued study of how disturbance, management activities and environmental factors affect carbon stocks;
- improved mapping of current whitebark pine conditions; and
- predictions of how climate change may affect whitebark pine and other species.

Additional Information

Barndt, S., K. Reid, and J. Chaffin. 2016. Assessment for Forest Plan Revision - Aquatic and Riparian Ecosystems Report, Custer Gallatin National Forest.

Lamont, S. and K. Reid. 2016. Assessment for Forest Plan Revision – Invasive Plants Report, Custer Gallatin National Forest.

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Reid, K. 2016. Assessment for Forest Plan Revision - At Risk and Potential Plant Species of Conservation Concern Report, Custer Gallatin National Forest. .

Sandbak, D. 2016. Assessment for Forest Plan Revision – Baseline Assessment of Carbon Stocks Report, Custer Gallatin National Forest.

Sandbak, D. 2016. Assessment for Forest Plan Revision – Terrestrial Ecosystems, Forested Vegetation Report, Custer Gallatin National Forest.

Shea, J. 2016. Assessment for Forest Plan Revision – Fire Report, Custer Gallatin National Forest.

These reports are available on the Custer Gallatin Forest Planning Web page at: www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

They can also be obtained by requesting a copy from the contact listed inside the cover page.

Terrestrial Wildlife Ecosystems and Species

"In the evening we saw a Brown or Grisley beare on a sand beech ...

This animal is the largest of the carnivorous kind I ever saw ...

I think his weight may be stated at 500 pounds."

- From the Lewis & Clark expedition journals

The Value of Custer Gallatin Wildlife

When Lewis and Clark crossed present-day South Dakota and Montana in 1804 and 1805, they were confronted by natural wonders that few individuals of European descent had ever seen before: bison herds stretching as far as the eye could see and flocks of birds that darkened the autumn sky. Today, the casual Custer Gallatin visitor can expect a taste of that sense of wonder, while backcountry adventurers may get even closer to what Lewis and Clark experienced more than a century ago ... and a clear reminder that humans share this world with many other creatures, great and small.

While the national landscape has changed drastically over the past 111 years, the Custer Gallatin is mostly made up of undeveloped "ecosystems," which are defined as communities of interacting living things and their physical environment. The western part of the Custer Gallatin is part of the Greater Yellowstone Ecosystem, which includes the major landscapes in and around Yellowstone National Park. Covering about 35,500 square miles, this area is one of the largest intact ecosystems in the continental United States and one of the largest remaining intact ecosystems in the Earth's temperate zone (the part of the planet's surface that's between the polar and equatorial regions).



A grizzly bear in the Greater Yellowstone Ecosystem (photo courtesy of Terry Jones)

Because of this lack of development—and helped by land management and species protection actions along the way—the Greater Yellowstone Area portion of the Custer Gallatin includes every single known terrestrial wildlife species that has lived in the area since settlers of European descent arrived in the 1800s. That includes grizzly bears, bald eagles, peregrine falcons, gray wolves and bison. The eastern Custer Gallatin is missing only a few species, such as black-footed ferrets and plains bison.

Social, Environmental and Economic Benefits

Wildlife and habitat on the Custer Gallatin have a great many social, economic, recreational, spiritual and scientific benefits to people. Wildlife hunting and trapping have a strong tradition in western culture and are a major economic driver in western states. Viewing and photography of wildlife also contribute greatly to local economies. Millions of people travel to this region every year to visit the area, often coming to see Yellowstone National Park and extending their visit to the Custer Gallatin. These visitors come for a variety of reasons, but

the chance to see wildlife is generally on the list. Because of the national forest's incredible wildlife diversity and the presence of rare species, Custer Gallatin wildlife resources are nationally and internationally recognized and cherished, attracting the attention of wildlife observers, professionals and advocates worldwide.

Wildlife Directives and Challenges

The Forest Service's 2012 Planning Rule lists wildlife conservation as a priority. The Planning Rule states, "wildlife habitat shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species." This directive is becoming more challenging because of changing factors, including rising recreational use, demand for services and amenities, local land development and a warming climate.

The Custer and Gallatin forest plans each contain goals, objectives and standards for wildlife and habitat, including some that are directed at individual species, groups of species, and habitat conditions. The Gallatin forest plan emphasizes forage and cover needs on big game winter ranges, managing vegetation to maintain or improve habitat, providing for plant diversity and protecting special habitats. The Custer plan's focus is to actively manage habitat while minimizing harm from other resource activities, giving special consideration to threatened, endangered and high interest species. Both plans contain monitoring requirements.

Following are a few of the management concerns related to wildlife habitat on the Custer Gallatin.

- **Adjacent Private Lands.** Nearby human land development can reduce management options and result in conflicts related to wildlife, including the increased likelihood of wildlife predation on livestock and pets.
- **Climate Warming.** A warming climate can cause increased frequency or severity of drought, fire, wind, floods, insects and disease. These changes can alter habitat characteristics and force species to seek more suitable areas.
- **Habitat Fragmentation and Wildlife Corridors.** For various reasons, including human-caused land development, certain species are often stranded in isolated islands of suitable habitat. This can restrict genetic diversity, seasonal movement and the ability of a species to move to a more suitable habitat area.
- **Landscape Changes.** Wildfire, insect infestations, invasive plant species, historic fire suppression and a warming climate are among the many factors that can make habitats unsuitable for the species that live there.
- **Management Coordination.** Wildlife ignore and frequently cross national forest boundaries. As a result, habitat and wildlife management efforts must often be coordinated with other land management agencies and private landowners.
- **Multiple Use.** Under the Federal Land Policy and Management Act of 1976, "multiple use" allows various recreational activities, commercial resource extraction and other land uses, which can change habitat or disturb wildlife.
- **Protected Area Locations.** Although more than two-thirds of the Custer Gallatin is designated as having some level of protected status (such as wilderness), many of these areas are at high elevations that are not suitable for all species on the national forest.

- **Species Interactions and Environmental Impact.** Changes in species populations and locations can affect other species and overall habitats. Examples include mountain pine beetles, predatory species such as wolves, and “engineer” species such as beavers.
- **Wildfire.** In recent decades, wildfires in certain areas on the Custer Gallatin have been more severe, more frequent, or both. Following many recent large fires, vegetation that had been relatively diverse was replaced by vegetation with much less variety—a condition that may change habitat suitability for various kinds of wildlife.

Habitat Conditions

There are five “landscape areas” on the Custer Gallatin, described below. The first three are considered “montane” (mountainous) areas while the other two are considered “pine savanna” areas: open grasslands and forests with ground cover of grasses and herbs.

The Bridger migratory flyway hosts more than 2,000 migrating raptors each fall, including more migrating golden eagles than anywhere else in the United States outside of Alaska.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains

This landscape makes up nearly 70 percent of the Custer Gallatin plan area and provides the largest unbroken area for wildlife on the national forest. Although it’s divided by the Gallatin and Yellowstone River corridors, Montana Highway 191 and Highway 89, this area shares boundaries with several other federally managed lands: Yellowstone National Park and the Beaverhead-Deerlodge, Caribou-Targhee and Shoshone National Forests. This landscape area is 45 percent designated wilderness. In addition, 28 percent of this landscape is designated as inventoried roadless area, wilderness study area or research natural area. This landscape area is home to grizzly bears, Canada lynx, wolverines, bison, bald eagles, gray wolves and bighorn sheep.

Bridger, Bangtail and Crazy Mountains

Also part of the montane ecosystem, this landscape area is north of the other Custer Gallatin National Forest areas and is separated from them by Interstate 90. This area, which accounts for about 9 percent of the Custer Gallatin plan area, has no designated wilderness areas, but about 40 percent is designated as inventoried roadless area. Highway 86 separates the Bridger Range from the Bangtails while Highway 89 and the Shields River valley separates the Bangtails from the Crazy Mountains. This landscape includes most native species but not bison, bighorn sheep or grizzly bears. This area is a potential wildlife corridor between the Greater Yellowstone Ecosystem and other large blocks of wildlife habitat to the north, such as the Northern Continental Divide Ecosystem in northwest Montana.

Pryor Mountains

The Pryor Mountain landscape area is the easternmost montane ecosystem on the Custer Gallatin. There are no designated wilderness areas, but about 13 percent of the Pryor landscape is designated as inventoried roadless area. This landscape also supports a native species mix that’s similar to the Bridger, Bangtail and Crazy Mountains landscape area.

While there are no bison or grizzly bears in the area, black bears and deer are abundant. The Pryor landscape represents a transition from the montane to the pine savanna ecosystem and contains a few notable pine savanna species such as eastern red bat, greater sage-grouse and prairie voles.

Ashland District

The Ashland District, located east of the Pryor Mountains in Montana, has a pine savanna ecosystem. It's one of the largest unbroken blocks of forested public land in eastern Montana and it makes up about 15 percent of the Custer Gallatin plan area. This part of the national forest has no designated wilderness areas, but about 8 percent of the landscape is designated as inventoried roadless area.

Nearly 60 percent of the Ashland District landscape has been affected by large fires since 1995.

The Ashland District has been hugely impacted by wildfires in recent years. Nearly 60 percent of the Ashland landscape has been affected by large fires since 1995. In 2012 alone, about one-third of this landscape area burned in the Ash Creek and Taylor Creek fires. These large, recent fires have changed the amount and distribution of forest cover across the landscape, reducing the percent of land covered by forest from about 50 percent in 1995 to about 25 percent today. This change has probably changed the mix of wildlife in the area. For example, elk and woodpecker populations have increased dramatically in recent years.

Sioux District

Located at the eastern end of the Custer Gallatin, the Sioux District has a pine savanna ecosystem. This landscape area, which is about 5 percent of the plan area, has no designated wilderness but contains two National Natural Landmarks. The Sioux District contains eight distinct units, three in Montana and the rest in Harding County, South Dakota. These eight units are separated by state highways and privately owned lowland properties—mostly ranchland and agricultural areas, but some with native grassland areas. Several wide-ranging species that have been rare or absent from the Sioux landscape for decades have moved back into the area in recent years. These include elk, moose, black bear and mountain lion.

Species Classifications

The Forest Service's 2012 Planning Rule requires national forest planners to identify and evaluate vulnerable species in the plan area. Definitions of several vulnerable species classifications can be found below.

Endangered Species. These are species that are federally recognized as being at serious risk of extinction. Species that are being considered for this designation are called "proposed endangered species." When there are higher-priority species listing evaluations, species on the waiting list to be proposed are called "candidate species."

Threatened Species. These are species that are federally recognized as likely to become extinct in the foreseeable future throughout all or a significant part of their range. Species that are being considered for this designation are called "proposed threatened species."

Species of Conservation Concern. The Forest Service designation of “species of conservation concern” applies to native species that are not included in Federal categories but have declining populations, habitat threats, restricted habitat range or other factors of concern and for which the best available scientific information indicates substantial concern about the species’ capability to persist over the long term in the plan area. Custer Gallatin staff have identified potential species of conservation concern for the Regional Forester, who determines the final list for species of conservation concern. A full list of wildlife species that were evaluated but not identified as potential species of conservation concern by Custer Gallatin staff is included in the wildlife specialist report.

Species of Public Interest. These are species that are commonly enjoyed and used by the public for hunting, trapping, observing or sustenance, including cultural or tribal uses. State fish and wildlife agencies manage many of these species through hunting regulations. Lists of vulnerable species are kept by various State and Federal agencies. The U.S. Fish and Wildlife Service keeps lists of federally endangered, threatened, proposed and candidate species while State wildlife management agencies and Natural Heritage Programs track other vulnerable species.

*State fish and wildlife agencies manage wildlife
while the Forest Service manages their habitat.*

Specific Species on the Custer Gallatin

Wildlife habitat on the Custer Gallatin is extremely diverse, ranging from southwest Montana’s rugged mountain peaks to the pine forests, buttes and bluffs of the pine savanna ecosystem in South Dakota and eastern Montana. According to the Montana Natural Heritage Program website, at least 79 mammal species, 262 bird species, 11 reptile species and 291 invertebrate species have been recorded on the Custer Gallatin. Threatened and endangered species that are not known to occur on the Custer Gallatin but that the U.S. Fish and Wildlife Service lists as “may be present” are described in the specialist report cited at the end of this section. These species include black-footed ferrets, least terns, red knots and whooping cranes. Following are descriptions of several species relevant to Custer Gallatin managers and visitors, listed alphabetically.

Bighorn Sheep (species of interest)

Bighorn sheep are valued for recreational benefits such as hunting and viewing. They also have cultural and tribal value and provide a food source for many key predators, such as bears, cougars and wolves. On the Custer Gallatin, they are found mostly in montane regions. Populations vary widely, mainly due to disease. Management issues include invasive plants, human development, disease transmission from domestic sheep and goats, and potential lack of genetic diversity because of herd isolation. A thorny problem with bighorn sheep is that when the population increases, so does the likelihood of exposure to disease. Current bighorn sheep numbers are much lower than their historical populations, with perhaps only a few hundred living on the national forest. A Forest Service goal is to collaborate with Montana Fish, Wildlife and Parks to reestablish bighorn sheep and maintain existing bighorn populations.

Bison (species of interest)

An iconic animal of the American West, bison are an important species for many reasons, including tourism, scientific research and cultural values. Modern Yellowstone bison, which are descended from the last wild plains bison herd, spend most of the year in Yellowstone National Park. During most winters, when food is limited by deep snow, bison migrate north into the Gardiner Basin and west into the Hebgen Basin. These two basins include portions of the Custer Gallatin.

The Custer Gallatin is the only national forest occupied by wild bison for a portion of the year.

Management of bison comes under the Interagency Bison Management Plan, which is a cooperative, multi-agency effort that guides the management of bison in and around Yellowstone National Park (see their Web site at www.ibmp.info). Custer Gallatin involvement in management of bison is primarily through participation in the plan. The Forest Service is scheduled to become the lead agency for this partnership in 2017.

Since near-extinction more than a century ago, Yellowstone bison populations have steadily increased and since 2000 have ranged from about 2,500 to just under 5,000 animals (the management plan objective is 3,000.) The herd's population growth since 1901 can be seen in Figure 9.

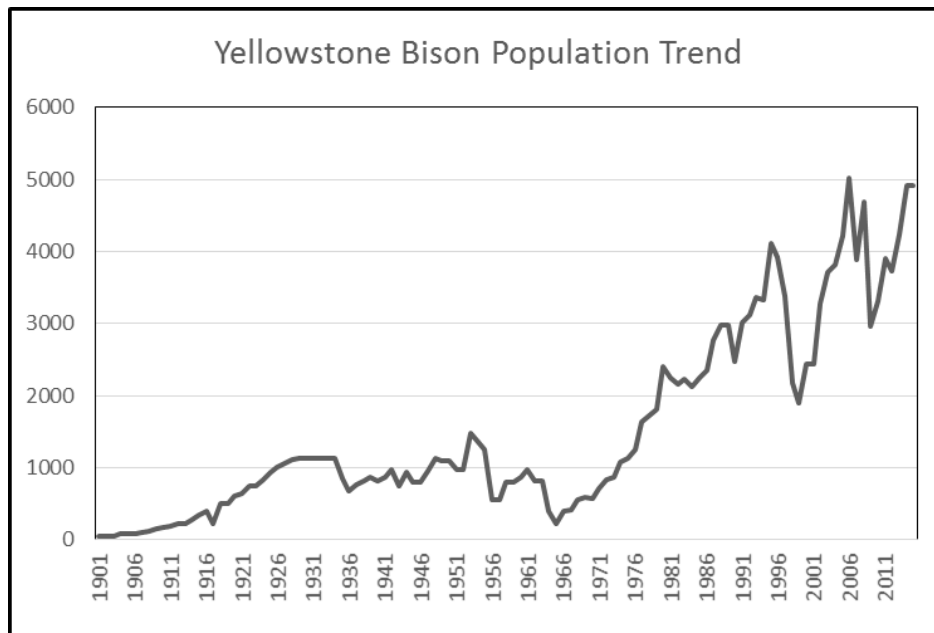


Figure 9. Yellowstone Bison population since 1901 (source: National Parks Conservation Association)

To manage population growth, Montana has a regulated bison hunting season and tribal members also hunt bison outside of Yellowstone National Park. Bison management concerns include population growth that exceeds available habitat and public concern over livestock exposure to brucellosis, a bacterial infection that can cause failed pregnancy and temporary sterility. While there have been no documented cases of brucellosis transmission

between bison and livestock, management policy is to keep bison and livestock separated as much as possible, given land ownership restrictions. However, potential land management agreements could expand the habitat area, and in December 2015 Montana Governor Steve Bullock signed a decision notice that expanded the “tolerance zone” for bison, mainly west of Yellowstone National Park.

Canada Lynx (threatened species)

A rare and elusive member of the cat family, the Canada lynx is appreciated for its mere existence, as well as its ability to survive in generally cold, snowy and remote mountain areas. The Canada lynx is associated with wildness and mystery and is a popular topic for research, documentaries and the arts.

The Canada lynx was listed under the Endangered Species Act in 2000 for one main reason: a lack of direction in land management plans to conserve lynx and its habitat in response to ongoing related human activities and natural processes. While these animals have been seen in Custer Gallatin mountainous areas in the past, there have been no documented sightings on the national forest since 2009. Current estimates for this population on the national forest and the entire Greater Yellowstone Area are fewer than 10 individual lynx, and perhaps none. Low populations on the Custer Gallatin are likely due to patchy habitat and geographic separation from core populations in Canada.

Snowshoe hares are the main prey for Canada lynx. The Forest Service’s Northern Rockies Lynx Management Direction prohibits thinning young regenerating trees in snowshoe hare habitat under most circumstances, to help maintain cover and food for the hares. However, because core lynx habitat on the Custer Gallatin is mainly in designated wilderness, such management actions have been limited in core habitat. Climate warming is also a concern, as it could reduce habitat area for snowshoe hares and lynx.

Elk (species of interest)

Located in all Custer Gallatin landscape areas (although relatively rare in the Sioux District and Pryor Mountains), elk are valued for hunting, wildlife viewing, and for their tribal and cultural significance. They also help maintain populations for key predators, including bears, cougars and wolves. Elk numbers have been increasing in Montana and throughout the west since the early to mid-1900s and also since the Custer and Gallatin forest plans became effective in the 1980s. The population is controlled by hunting, which is managed by State fish and wildlife agencies.



**A bull elk in the Greater Yellowstone Ecosystem
(photo courtesy of Terry Jones)**

The Custer Gallatin goal of maintaining healthy elk populations on public land is sometimes complicated by adjacent private lands. One risk is that expanding elk populations could negatively affect private lands that are working livestock ranches. As of 2016, Custer Gallatin elk habitat management focuses on providing hiding cover, which is based on a percentage

of canopy cover, and secure habitat, which is based on distance from roads and other motorized routes.

Many of the elk herds on the Custer Gallatin are within State agency population targets, with a few exceptions. For example, the Northern Yellowstone herd has declined, which may be the result of overharvest by hunters, predation by wolves, and competition with a growing bison population on the northern range. On the other hand, some elk herds in the Bridger, Bangtail and Crazy Mountains are above State objectives, and elk on the Ashland District have spread and increased in numbers.

Greater Sage-grouse (potential species of conservation concern)

This species, the largest grouse in North America, is considered to be in decline due to habitat loss. It was recently considered for Federal listing under the Endangered Species Act but was not listed because the main threats to the species have been addressed by State and Federal agencies and private landowners. Greater sage-grouse are usually not found on the Custer Gallatin, but there are a few on the Pryor Mountains landscape area and they've been seen on the Ashland District and the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area. The Custer forest plan includes restrictions on a variety of ground and vegetation disturbances near sage-grouse winter ranges and mating areas. Management concerns related to this species include habitat impacts from invasive plant species, climate change, human development and livestock grazing.

Grizzly Bear (threatened species)

Another iconic species, grizzly bears are rare in the conterminous United States. Just the possibility of seeing one in the wild is a draw for many tourists visiting the Custer Gallatin. Prior to European settlement in North America, an estimated 50,000 grizzly bears roamed throughout western North America. The species was reduced to less than 2 percent of this number by the 1930s and was listed as a threatened species in the 1970s.

In a noted success story for the Endangered Species Act, the Greater Yellowstone Ecosystem grizzly bear population met recovery objectives in 1998. Despite "delisting" disputes since then, including a March 2016 delisting proposal, the species remains federally listed as threatened as of November 2016.

As the following figures show, the Greater Yellowstone Ecosystem grizzly bear population has expanded beyond the "recovery zone," also known as the primary conservation zone that was set as a target habitat area. The Greater Yellowstone Ecosystem grizzly bear population is estimated at more than 700. The population appears stable and may have reached the limit of what the habitat can support. The Custer Gallatin administers nearly 20 percent of the suitable habitat identified for Greater Yellowstone Ecosystem grizzly bears.

***The Greater Yellowstone Ecosystem
grizzly bear population met recovery
objectives in 1998.***

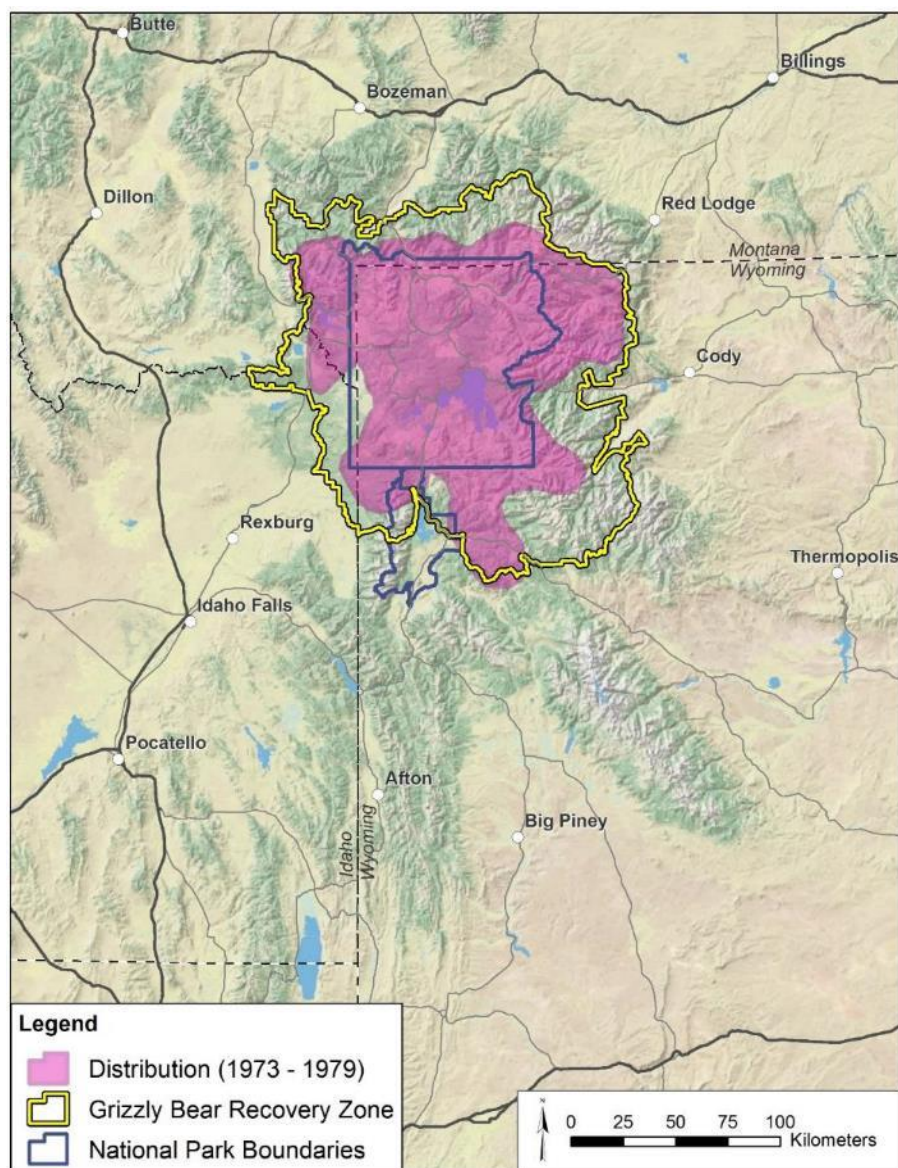


Figure 10. Grizzly bear distribution 1973 to 1979

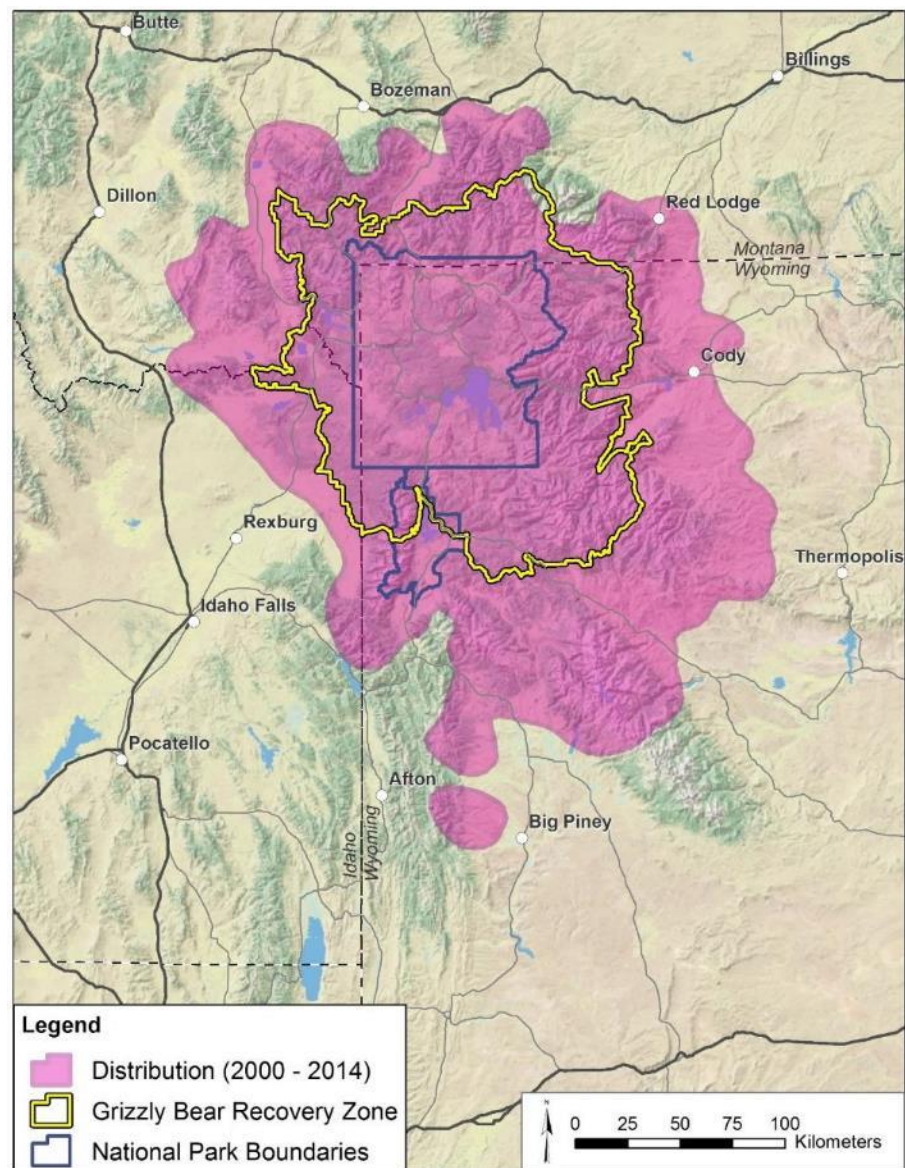


Figure 11. Grizzly bear distribution 2000 to 2014

Custer Gallatin grizzly bear habitat management follows directives from several sources: a November 2015 amendment to the 1987 Gallatin forest plan, the current Custer forest plan, the 2006 Gallatin National Forest Travel Management Plan and the 2008 Beartooth District Travel Management Plan. A U.S. Fish and Wildlife Service report entitled “Conservation Strategy for the Grizzly Bear in the Yellowstone Ecosystem” also provides guidance. This strategy was developed by an interagency team that included the Forest Service. Aside from the travel plans, there are no forest plan standards or guidelines that apply specifically to grizzly bear habitat management on national forest lands outside the recovery zone.

Given that the local grizzly bear population and distribution have exceeded targets, some people view grizzly-related land restrictions as an unnecessary infringement on the rights of people to use public land. Other management concerns include conflicts between bears and people (a rising concern with more people accessing backcountry areas), livestock predation, the impact of insects and disease on whitebark pine seeds (a grizzly food source), and genetic isolation from more than 50 years of being cut off from other grizzly populations. The Bridger, Bangtail and Crazy Mountain Ranges could be used as corridors to connect these habitats.

Moose (species of interest)

Moose are found on all of the montane areas of the Custer Gallatin but are not usually seen in the Pryor Mountains landscape area or the Ashland or Sioux Districts. Local populations have recently fallen, but it's not known whether this is due to environmental changes, overhunting or if it's simply a low cycle, as was seen in 1976 and 1987. This species is valued in terms of tourism, hunting, scientific research, and cultural and tribal values. Hunting is managed by State fish and wildlife agencies.



**A bull moose in the Greater Yellowstone Ecosystem
(photo courtesy of Terry Jones)**

Mountain Goats (species of interest)

Mountain goats were introduced to the plan area more than 30 years ago. They can be found in the Absaroka, Beartooth, Gallatin, Madison, Crazy and Bridger Mountains and are considered valuable for hunting and recreational viewing. Mountain goat populations are falling in some parts of Montana, but overall seem secure and are even increasing in the plan area, which is estimated to have a population of more than 900 of the animals. Management concerns include possible habitat disturbance from climate warming and snowmobile use, and possible disease transmission to bighorn sheep. Mountain goat management is largely the authority of Montana Fish, Wildlife & Parks.

Mule Deer (species of interest)

Located across the Custer Gallatin, mule deer are a species of interest for hunting and viewing. No specific management standards are outlined, but the Custer forest plan requires winter range monitoring and mule deer are included in the Gallatin forest plan's overall management direction. Montana and South Dakota are charged with species management.

Northern Long-eared Bat (threatened species)

The northern long-eared bat was listed as a threatened species in April 2015. This is a far-ranging species, typically found in forested habitat during summer and hibernating in caves, mines and other structures during winter. White-nose syndrome, a fungus that interferes with winter hibernation, is the main conservation concern for this species. White-nose syndrome has not yet been detected on the Custer Gallatin, so there are currently no management restrictions or requirements related to the species on the national forest.

Pronghorn Antelope (species of interest)

Pronghorn antelope are a species of interest for hunting and viewing. The range for this plains species includes the entire plan area, but most suitable habitat is on the Ashland and Sioux Districts. Montana and South Dakota wildlife agencies are charged with management of pronghorn antelope.

Sharp-tailed Grouse (species of interest)

An upland game bird, sharp-tailed grouse are a species of interest for hunting and viewing that are mostly located on the Ashland and Sioux Districts. The Custer forest plan requires mating areas to be evaluated when grass stubble in a one-mile radius is below 12 inches high on average, while the Gallatin forest plan does not have management direction. Management concerns include predation, hunting, disease, overgrazing and loss of open landscape from fire suppression, invasive species and other factors. Montana and South Dakota wildlife agencies are charged with management of this grouse.

White-tailed Deer (species of interest)

White-tailed deer occur across the Custer Gallatin plan area but most suitable habitat is in the national forest's pine savanna ecosystems. The Custer forest plan lists white-tailed deer as a key species of interest (mostly for hunting and wildlife viewing) on the Sioux District. The Custer forest plan contains monitoring requirements for white-tailed deer winter range. White-tailed deer are not specifically addressed in the Gallatin forest plan, but rather are included in overall management direction. Montana and South Dakota wildlife agencies are charged with management of white-tailed deer.

White-tailed Prairie Dog (potential species of conservation concern)

This species, once common throughout the U.S. Rocky Mountain area, is estimated to occupy less than 10 percent of its historic range, mostly because of disease, land development, poisoning and recreational shooting. It's one of five prairie dog species native to North America. On the Custer Gallatin, this species is only known to occur in the extreme southeast corner of the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area.



White-tailed prairie dog

This area, plus surrounding private land and land managed by the Bureau of Land Management, are the only areas where the species is known to occur in Montana. The species is not known to occur in South Dakota. Montana classifies prairie dogs as both a nongame species and an agricultural pest. However, the Montana State Wildlife Action Plan lists this species as being at high risk of local extinction and the Custer forest plan requires monitoring every three years.

Wild Turkey (species of interest)

Although wild turkey habitat exists on all five landscape areas, wild turkeys have mostly been sighted in the Ashland and Sioux Districts. Population and trend information is limited. The Custer forest plan lists wild turkey as a key species of interest on the Sioux District (due to hunting), but neither the Custer nor the Gallatin forest plans contain management direction. Montana and South Dakota wildlife agencies are charged with the management of wild turkey.

Wolverine (proposed threatened species)

The wolverine is the largest land-dwelling member of the weasel family. With large, flat feet, a compact body and a thick coat of fur, the species lives in cold, snowy areas. Like the grizzly bear, the wolverine symbolizes ferocity, persistence and the successful conservation of wild areas. The wolverine was petitioned for listing under the Endangered Species Act in 2000. As of November 2016, the wolverine is proposed for listing and is considered present on the Custer Gallatin, although probably in very low numbers. Only the two westernmost montane areas on the Custer Gallatin are believed to include suitable wolverine habitat.

The Custer and Gallatin forest plans have no direction specifically addressing wolverines or their habitat. However, both forest plans require special review of possible management effects related to proposed threatened species or “sensitive species,” which is how the wolverine was previously classified by the Forest Service. Since wolverines select habitat that is remote, there has been limited management activity in wolverine habitat. Wolverine management concerns include shrinking habitat due to climate warming.

Looking Forward: Conclusions and Concerns

Custer Gallatin wildlife is a valuable resource on many levels, with a wide variety of management concerns and issues. Certain species such as grizzly bears and bison are considered conservation success stories on many levels, but they continue to be complex from a management perspective due to issues such as human developments and grazing requirements. Other species such as bighorn sheep are ongoing management concerns that sometimes seem to evade solutions. With the Custer Gallatin forest plan revision process, national forest planners have the opportunity to review management direction and make them consistent while updating language and rules relative to changes in Federal, State and Forest Service wildlife protection laws and rules.

To help with future wildlife management, Custer Gallatin specialists would benefit from the following information:

- continued information on the ecology of bighorn sheep herds, including ongoing studies by Montana Fish, Wildlife & Parks and Montana State University
- continued or expanded monitoring of existing and potential habitat for bison, northern long-eared bats, Canada lynx, greater sage-grouse, white-tailed prairie dogs and black-footed ferrets
- additional information regarding the potential threat of white-nose syndrome on the Custer Gallatin
- habitat monitoring for change, including factors such as invasive species and climate warming

Additional Information

Dixon, B., et al. 2016. Assessment for Forest Plan Revision – Terrestrial Wildlife Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

ASSESSING SOCIAL AND ECONOMIC SUSTAINABILITY AND MULTIPLE USES

Cultural and Historical Resources and Uses

“Here is your country. Cherish these natural wonders, cherish the natural resources, cherish the history and romance as a sacred heritage, for your children and your children’s children. Do not let selfish men or greedy interests skin your country of its beauty, its riches or its romance.”

- Theodore Roosevelt

A Complex Responsibility

Scattered throughout the Custer Gallatin’s pine savannas, forests, mountains and valleys are more cultural resource sites than any other national forest in the Forest Service’s Northern Region—an area covering 25 million acres and 12 national forests. This is a point of pride for the staff of the Custer Gallatin, but it’s also a huge and frequently complex responsibility. The Forest Service is required to manage traditional cultural properties and resources while complying with Federal historic preservation laws, balancing cultural resource preservation and cultural values with the sustained use of forest resources. With five distinct landscape areas spread across 400 miles, a wealth of natural resources and more than 10,000 years of human history represented in the Custer Gallatin, managing cultural and historic resources is a balancing act that also requires skill in juggling.



Beartooth Scenic Byway (photo courtesy of Terry Jones)

The Need for Preservation

Cultural and historic resources provide scenic, economic, ecological, social, recreational and educational opportunities that help us understand ourselves as individuals, communities and as a nation. Their preservation can yield an improved quality of life and a sense of place or identity for future generations. However, cultural resources are subject to a wide range of

natural and human-caused factors that can result in damage or destruction. These include natural exposure, erosion, vandalism, construction, wildfire, logging, mining, grazing and climate change.

Laws and Regulations

Because cultural resource sites are nonrenewable resources and easily damaged, there are many laws and regulations to help protect them. One of these is the National Historic Preservation Act of 1966, which requires Federal agencies to consider the effects of their decisions on historic properties. The Act also established the National Register of Historic Places, which is the United States' official list of sites, objects, districts and landscapes that have qualified as being worthy of preservation.

Cultural resources that are listed on the National Register or are eligible for listing are called "historic properties." For a property to be eligible for the National Register, it must meet at least one of the following criteria:

- historical contribution
- association with a significant person or people
- distinctive or significant architecture or construction
- actual or likely contribution of important historical information

An eligible historic property can be further classified as a "traditional cultural property" or a "cultural landscape." A traditional cultural property is eligible for National Register listing because of its association with the values, cultural practices or beliefs of a living community that are rooted in the community's history, and are important in maintaining the continuing cultural identity of the community. A cultural landscape is a geographic area (including cultural and natural resources), that is associated with a historic event, activity or persons, or that demonstrates other cultural or aesthetic values.

The Custer and Gallatin National Forest plans from the 1980s have different priorities and levels of detail related to the National Historic Preservation Act. While the Forest Service follows new direction when it is adopted, the decades-old forest plans do not reflect new laws, regulations, and guidance developed over the past 30 years. However, both contain management goals and objectives related to cultural preservation and both mention sites of cultural importance.

Taking Inventory

The Custer Gallatin's cultural resources represent a wide variety of cultural and historical themes, including Native American use, tribal-U.S. Government conflict, mining, agricultural development, ranching, timber, transportation, homesteads, local settlement, fire detection, recreation, Civilian Conservation Corps projects and Forest Service administrative history. In fact, the national forest's eastern districts contain some of the most varied and complete cultural resources in the northern Great Plains.

The national forest's eastern districts contain some of the most varied and complete cultural resources in the northern Great Plains.

As of July 2016, more than 4,300 Custer Gallatin cultural resources were listed in the Forest Service's database. Of these cultural resources, 48 are listed on the National Register, 541 are eligible for nomination and 176 have been found to be not eligible. This leaves 3,595 sites, or 83 percent of the sites in the database, that have not been evaluated for National Register eligibility.

Since the late 1970s, parts of the Custer Gallatin have been inventoried for cultural resources. However, only about 222,000 of the national forest's more than 3 million acres have been inventoried, usually as part of unrelated management activities such as vegetation and fuels treatments, recreation development, oil and gas development, mine expansion and reclamation, rangeland management and engineering projects. There is enough information, however, to provide representative examples of culturally and historically significant properties on the national forest. A few of these examples are listed below, by landscape area.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains

Nez Perce National Historic Trail. This trail, which stretches from Wallowa Lake, Oregon, to the Bear Paw Battlefield near Chinook, Montana, was named a National Historic Trail in 1986 to commemorate the 1877 flight of the non-treaty Nez Perce from their homelands in eastern Oregon, Idaho and Washington across what are now the states of Idaho, Montana and Wyoming. A map on the following page shows the distance the Nez Perce travelled.

OTO Homestead and Dude Ranch. Located north of Gardiner, the OTO was one of the first dude ranches in the West and was an important early dude ranch in the Yellowstone Park area. Acquired in the 1980s through a land exchange, the OTO has been the focus of years of restoration, training many volunteers and Forest Service managers in historic preservation. Through partnerships and programs such as Passports in Time and Heritage Expeditions, plans to use the facility for an adaptive use, perhaps as an environmental camp, are underway.

Red Lodge-Cooke City Approach Road. This was the first and most substantial road to be constructed under the 1931 Park Approaches Act. Its completion in 1936 linked the towns of Red Lodge, Cooke City and Yellowstone Park, opened new territory for purposes of recreational development and increased tourism in Yellowstone National Park and the region. The Beartooth Scenic Byway segment of the road has been called "the most beautiful roadway in America."

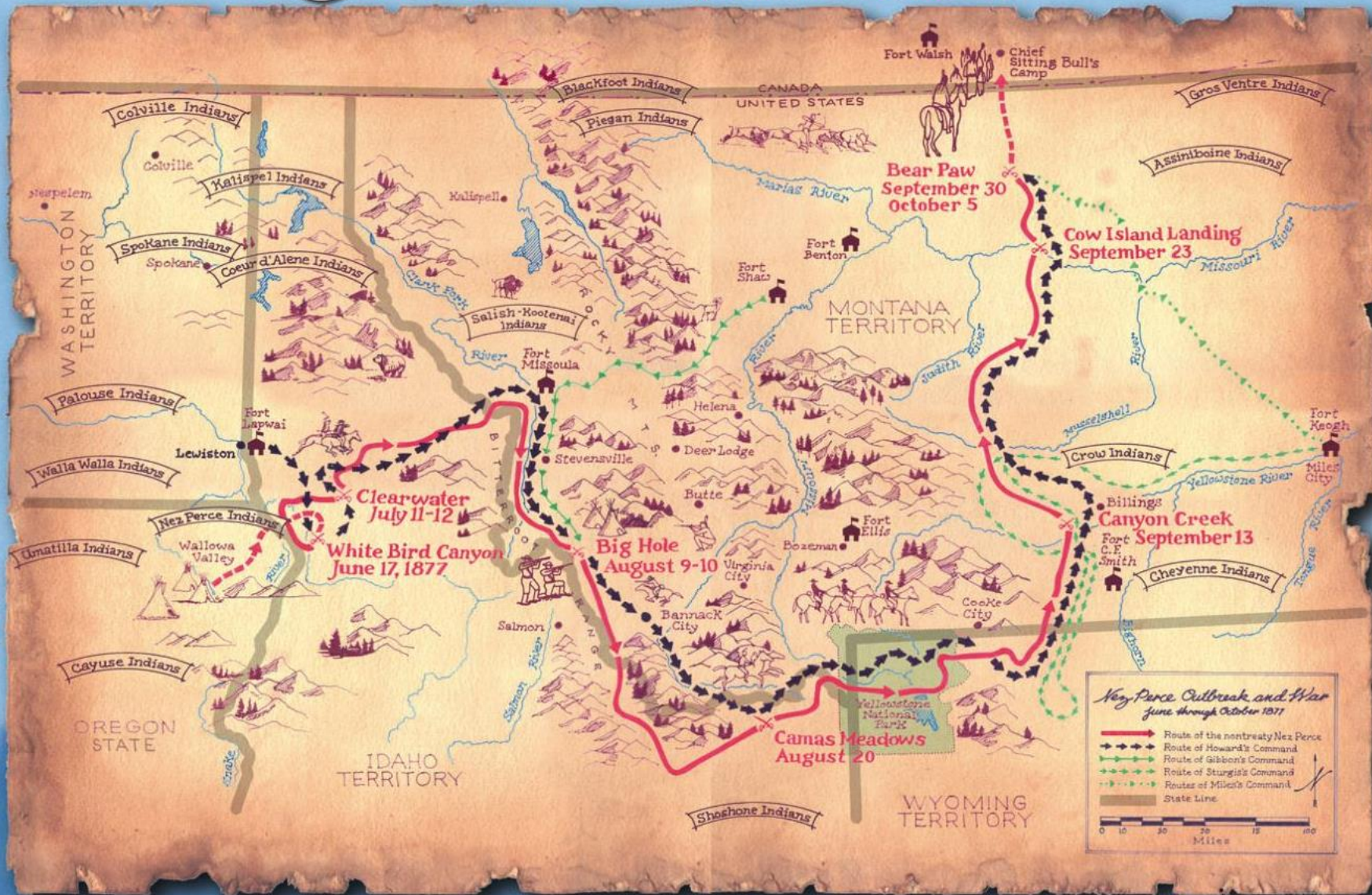
Bridger, Bangtail and Crazy Mountains

Crazy Mountains Traditional Cultural Property District. This area holds great cultural importance to the Crow and other tribes.

Pryor Mountains

Dryhead Overlook. This traditional cultural property includes fasting beds, rock cairns, stone circles and rock alignments located along the eastern scarp of East Pryor Mountain. It's considered a sacred landscape to the Crow and is honored as a place where a number of Crow leaders fasted and meditated during the difficult transition to reservation life.

Nez Perce (Nee-Me-Poo) National Historic Trail



The Nez Perce National Historic Trail follows the 1877 flight of the non-treaty Nez Perce from their homelands in northeastern Oregon to the Bear Paw Battlefield near Chinook, Montana

Ashland District

Tongue River Breaks. This landscape, which is within the Northern Cheyenne aboriginal territory, has several traditional hunting and gathering sites. It's also near some historical Northern Cheyenne homesteads. This area is being evaluated for designation as a cultural landscape.

The Tongue River Breaks area is being evaluated for designation as a cultural landscape.

Sioux District

North Cave Hills Archaeological and Traditional Use District. Several Indian tribes consider this area a sacred place. It contains 365 recorded archaeological locations and features, including petroglyphs, stone circles, ancient campsites, bison kill sites, eagle trapping sites and burial sites. Ludlow Cave, which is also located in this area, is considered a traditional cultural property.

Cross-Landscape Cultural Resources

Many cultural and historical sites are found in multiple landscape areas. Native American examples include stone circles, trail cairns, rock alignments, fasting structures, eagle trapping sites, log structures, burial sites, historic battlegrounds and plant collecting sites. Examples from the post-contact era include historic cabins, fire lookouts and various locations where the Civilian Conservation Corps built campgrounds, roads, trails, buildings and other structures during the 1930s.

Looking Forward: Conclusions and Concerns

The Custer Gallatin is home to a rich variety of cultural and historical sites and objects, but much needs to be done to better understand and protect these resources. Thousands of existing sites need to be prioritized and evaluated for potential National Register inclusion. The decades-old forest plans do not reflect new laws, regulations and guidance developed over the past 30 years. Research needs include inventorying significant sites, updating Forest Service databases, working with Indian tribes to identify special use areas and traditional cultural uses, identifying resources in need of preservation, and conducting surveys of relatively unexplored areas such as the Absaroka-Beartooth Wilderness, the Yellowstone Plateau and the Lee Metcalf Wilderness. Preservation funding efforts will likely need to increase as more cultural resources are identified. Finally, to reduce site damage from theft and vandalism, educational programs are needed to increase public awareness of cultural resources and their importance.

Additional Information

LaPoint, H. 2016. Assessment for Forest Plan Revision –Cultural and Historic Resources and Uses Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

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Areas of Tribal Importance

"...henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions ... including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites."

- American Indian Religious Freedom Act, 1978

“Sacred Ground”

The Custer Gallatin is undeniably important to many people, but not all of them would go so far as to call it “sacred.” Chief Plenty Coups, the last traditionally elected chief of all three Crow bands, famously used the word when he said, “The ground on which we stand is sacred ground. It is the blood of our ancestors.”

According to one commonly used definition, the word “sacred” basically means “holy,” or dedicated to a religious purpose. But another, less common definition of the word has legal overtones. That definition is “secured against violation or infringement, as by reverence or sense of right.” This definition can be useful in understanding the connection that at least 15 Native American tribes have with the Custer Gallatin National Forest.

Legal Responsibilities

The Federal Government has a “trust responsibility” toward federally recognized Native American tribes. This means that the Government has set the “highest moral obligation” to protect tribal lands, assets, resources and rights, including many established legal rights on lands outside of designated reservation lands. In addition, the American Indian Religious Freedom Act of 1978 requires Government agencies to eliminate interference with the free exercise of Native American religion and accommodate access to and use of religious sites if the use is reasonable and doesn’t conflict with an agency’s essential functions. According to the Act, a sacred site is a specific location on Federal land that a Native American tribe or its qualified representative has identified to a Federal agency as being sacred because of its religious or ceremonial significance. Executive Order 13007 took this a step further by directing Federal land managing agencies to avoid harming the physical integrity of these sites.

The Forest Service’s responsibility to protect tribal cultural resources and sacred sites is spelled out in many other laws, regulations and directives. For example, in 2012, the Forest Service and the Department of Agriculture’s Office of Tribal Relations were directed to review and evaluate existing laws, regulations and policies in terms of how well they provide a consistent level of protection for sacred tribal sites located on National Forest System lands. A few other directives include:

- The Food, Conservation, and Energy Act of 2008 (the 2008 Farm Bill), including subtitle B, which authorizes the reburial of Indian tribal human remains and cultural items found on national forest lands and temporary closure of national forest lands for cultural purposes, a confidentiality provision, and the authority to provide Indian tribes forest products for traditional cultural purposes.

- The Tribal Forest Protection Act of 2004.
- Executive Order 13007 (Indian Sacred Sites, 1996).
- The Archaeological Resources Protection Act of 1979.
- The Federal Land Policy and Management Act of 1976.
- The National Historic Preservation Act of 1966, including amendments that direct agencies to consult with tribes and consider traditional cultural properties.

What This Means for the Custer Gallatin

In the decades since the Custer and Gallatin forest plans were written, it has come to be understood that not just simply specific sites, but entire landscapes may qualify for special consideration by Custer Gallatin planners in land management decisions. Natural resources such as certain animals, plants and minerals are also considerations—for a Native American tribe to exercise its treaty-reserved rights and for the Forest Service to meet its trust responsibilities, the natural resources the tribes rely on must exist in healthy and sustainable populations on the national forest. In these cases, Native American concerns must be weighed against other potential land uses, including recreation and commercial uses that could provide regional economic or social benefits.

Because the governments and cultures of indigenous peoples are unique, Custer Gallatin land managers consult with at least 15 federally recognized Native American tribes in North and South Dakota, Montana, Wyoming, Idaho, Oregon and Washington that have treaty-based legal rights on Custer Gallatin lands or have communicated interest in the Custer Gallatin's natural and cultural resources as part of their traditional use areas. These tribes include:

- | | |
|--------------------------------------|--|
| • Arapahoe | • Nez Perce |
| • Cheyenne River Sioux | • Nez Perce Band of the Confederated Tribes of the Umatilla Indian Reservation |
| • Confederated Salish and Kootenai | • Northern Cheyenne |
| • Crow | • Pine Ridge Sioux |
| • Eastern Shoshone | • Rosebud Sioux |
| • Fort Peck Assiniboine and Sioux | • Shoshone-Bannock |
| • Lower Brule Sioux | • Standing Rock Sioux |
| • Mandan, Hidatsa and Arikara Nation | |

Locations of Concern

Studies and consultations with these tribes have identified several Custer Gallatin locations and landscapes as culturally significant. This information is used by the Federal Government when determining whether to register a location under the National Historic Preservation Act. Culturally significant sites can include burial sites, rock art, stone rings, monumental rock features, fasting structures, eagle-catching pits, sweat lodges, Sundance lodges, historic trails and battle sites, and offering and meditation locations. In addition, tribes have cultural connections or treaty rights related to areas used for activities such as fishing, hunting, fasting, meditation, and for gathering plants and mineral resources such as fossils, obsidian, soapstone, and clays for paint pigment. There are more than 1,000 of these sites on the Custer Gallatin and more are expected as many tribes seek to reconnect with the land.

Native American tribes have cited hundreds of significant locations, including several regions or landscapes. (Not all sacred sites or places are eligible for protection under the National Historic Preservation Act, and because of this the Forest Service must continuously consult with Native American tribes to understand which areas to protect).

A few of these culturally significant locations are described below, listed by landscape area.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains

The Hebgen Lake and Bozeman Districts are historical hunting grounds for many tribes, while the area around West Yellowstone and Gardiner are currently used by tribes for bison hunting. The Nez Perce National Historic Trail and the Bannock Trails are culturally significant sites as avenues used by Native American tribes from the west to the bison-rich prairies. The Gardiner, Yellowstone, Madison and Stillwater River valleys are culturally significant to the Crow, the Shoshone and other tribes as historical travel corridors.

Bridger, Bangtail and Crazy Mountains

The Crazy Mountains are considered a traditional cultural landscape. (Along with “traditional cultural property,” this is a term used by the Advisory Council on Historic Preservation, an organization that advises the President and Congress on national historic preservation policy. Properties and landscapes do not have to be designated in this way for a tribe to have the right to be consulted about related land use. As mentioned earlier, tribes may identify sacred sites and places that may require protective considerations. (Flathead Pass in the Bridgers may also be culturally significant to the Confederated Salish and Kootenai Tribes on the Flathead Reservation.)

Pryor Mountains

The Pryor Mountains are considered a traditional cultural landscape. The Crow and other tribes have historically used the Pryor Mountains for fasting, hunting, gathering and ceremonial purposes. The foothills are used for plant gathering, while other areas such as Dryhead Overlook are associated with historically important individuals such as Chief Plenty Coups. Dryhead Overlook is eligible for inclusion in the National Register of Historic Places.



View from the Dryhead Overlook located in the Pryor Mountains landscape area of the Custer Gallatin

Ashland District

The Tongue River Breaks are considered a traditional cultural landscape, with many rock art sites and historical fasting areas. The area immediately east of the Tongue River is important to the Northern Cheyenne because it is the location of 46 early Northern Cheyenne

homesteads that predate the creation of the reservation. These homesteads may contain burial sites, sweat lodges and other spiritually important features as well as remains of the homes. While not physically located on the Custer Gallatin, traditional-use areas associated with these locations may be found on the national forest. Several tribes have a historical connection to parts of the Ashland District.

Sioux District

The Lakota Sioux and other tribes consider the Cave Hills—particularly the North Cave Hills—to be a sacred area. The central points of interest here include historic rock art sites, which are used for mediation and spiritual guidance, and Ludlow Cave, which is eligible for inclusion in the National Register of Historic Places. The North Cave Hills area is also the site of the abandoned Riley Pass uranium mine (currently a Superfund project managed by the Custer Gallatin). Other sites of cultural importance include Long Pines, Chalk Buttes and Slim Buttes.

Looking Forward: Conclusions and Concerns

Custer Gallatin lands include sites and regions of immense cultural importance, both for regional Native American tribes and for others to better understand and appreciate Native American history and culture. The Forest Service has a legal responsibility to consider these sites and regions in relation to current and proposed uses of the land. Vandalism, theft, grazing, wind power equipment, telecommunication towers, prescribed burns, land deals, noxious weed control, recreational use and climate change are all potential land management issues that could reduce the cultural value of these sites.

National forest managers need to work closely with tribes to identify and prioritize areas of tribal cultural significance, including sacred sites. A number of cultural resources have been classified as traditional cultural landscapes or properties, while the North Cave Hills have been formally identified as a sacred site through tribal resolutions.

Archaeological research and a tribal reconnection with the land will likely result in an increased number of culturally significant sites. As this occurs, and to better understand and manage currently known tribal cultural sites and landscapes, Custer Gallatin managers have several opportunities to improve management of these locations. These opportunities include continued identification and classification of significant sites, continued consultation with tribes to verify sacred areas and identify other issues or locations of concern, and compilation of tribal place names and affiliations with associated tribes.

Additional Information

La Point, H. 2016. Assessment for Forest Plan Revision –Areas of Tribal Importance Report, Custer Gallatin National Forest.
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Social and Economic Benefits and Conditions

"Take care of the land and the land will take care of you."

- Hugh H. Bennett

Caring for the Land and Serving People

The Forest Service's official mission is to sustain the health, diversity and productivity of the nation's forests and grasslands to meet the needs of present and future generations. The Forest Service motto states this even more simply: "Caring for the land and serving people." To serve people well, the Forest Service needs to understand the needs, concerns and characteristics of the people who use and are affected by the nation's national forests. For the Custer Gallatin, which has a huge impact on the region's social and economic health, this means that national forest planners need to understand the people who visit the national forest as well as the many local regions, communities and cultures that are affected by it.



Livingston is one of the many communities that has a close connection with the Custer Gallatin

Social and Economic Sustainability and Consistency

Under the Forest Service's 2012 Planning Rule, social and economic issues are important considerations. In addition to managing a broad set of social and economic benefits, the Forest Service is required to serve the American public in a way that does not discriminate. This is the concept of environmental justice, a social movement that emphasizes the fair distribution of environmental benefits and burdens. The environmental justice concept emerged in the United States in the early 1980s, although its roots go much further back to the Civil Rights Movement of the 1950s and 1960s.

This movement was reflected in different ways in the 1986 Custer forest plan and the 1987 Gallatin forest plan. The Custer forest plan addressed employment and volunteer opportunities, working with tribal governments to identify assistance and natural resource management support opportunities, and increasing recreational options for minorities, senior citizens, people with disabilities, and the disadvantaged. The Gallatin forest plan focused on providing a variety of benefits to forest users.

In 1994, President Bill Clinton signed Executive Order 12898, which requires Federal agencies to address the effects of their programs, policies and activities on minority and low-income populations. The Council on Environmental Quality (a division of the Executive Office of the President) then issued guidance to agencies on how to address environmental justice under the National Environmental Policy Act of 1969. Agencies were instructed to examine

geographic distribution by race, income and other factors and to consider that information when making land management decisions. As part of this process, the Forest Service uses several informational sources, including Federal census data, the Economic Profile System-Human Dimension Toolkit and the Forest Service's National Visitor Use Monitoring Program.

Executive Order 12898 requires Federal agencies to address the effects of programs, policies and activities on minority and low-income populations.

As Figure 12 shows, the Custer Gallatin area includes two areas of high poverty and minority population levels: the Crow Indian Reservation and the Northern Cheyenne Indian Reservation, with other high-poverty areas near the eastern end of the national forest. Other areas with relatively high poverty levels are located north of the reservations in northwestern South Dakota.

Local National Forest Benefits

The Custer Gallatin's social, economic and environmental benefits are extensive and varied. They include:

- agriculture, including farming and ranching
- clean air
- culture, including ancient rock art, sacred tribal lands and locations, and historic buildings and structures
- natural lands conservation, recreation and scenery
- educational and volunteer programs that provide opportunities to connect with nature and learn about conservation
- employment, including jobs related to recreation, ranching, mining and timber
- forest products, including timber, firewood, Christmas trees, berries and mushrooms
- water resources, including delivery to agriculture, aquatic habitats and dams and hydropower that help meet local water and energy needs while contributing to recreational uses and related economic benefits
- Federal land payments including payments in lieu of taxes (Federal payments to local governments to help offset losses in property taxes due to non-taxable Federal lands within their boundaries)

Eleven Counties in Two States

Specialists analyzed Custer Gallatin contributions to local social and economic sustainability. Social sustainability was evaluated for the portions of 46 counties that are within 50 miles of Custer Gallatin boundaries (area shown in Figure 12). Economic sustainability was reviewed for 15 counties (area shown in Figure 13), including the 11 that include Custer Gallatin land. County documents were reviewed to identify the key benefits related to the Custer Gallatin. Each of these 11 counties is briefly described following the maps.

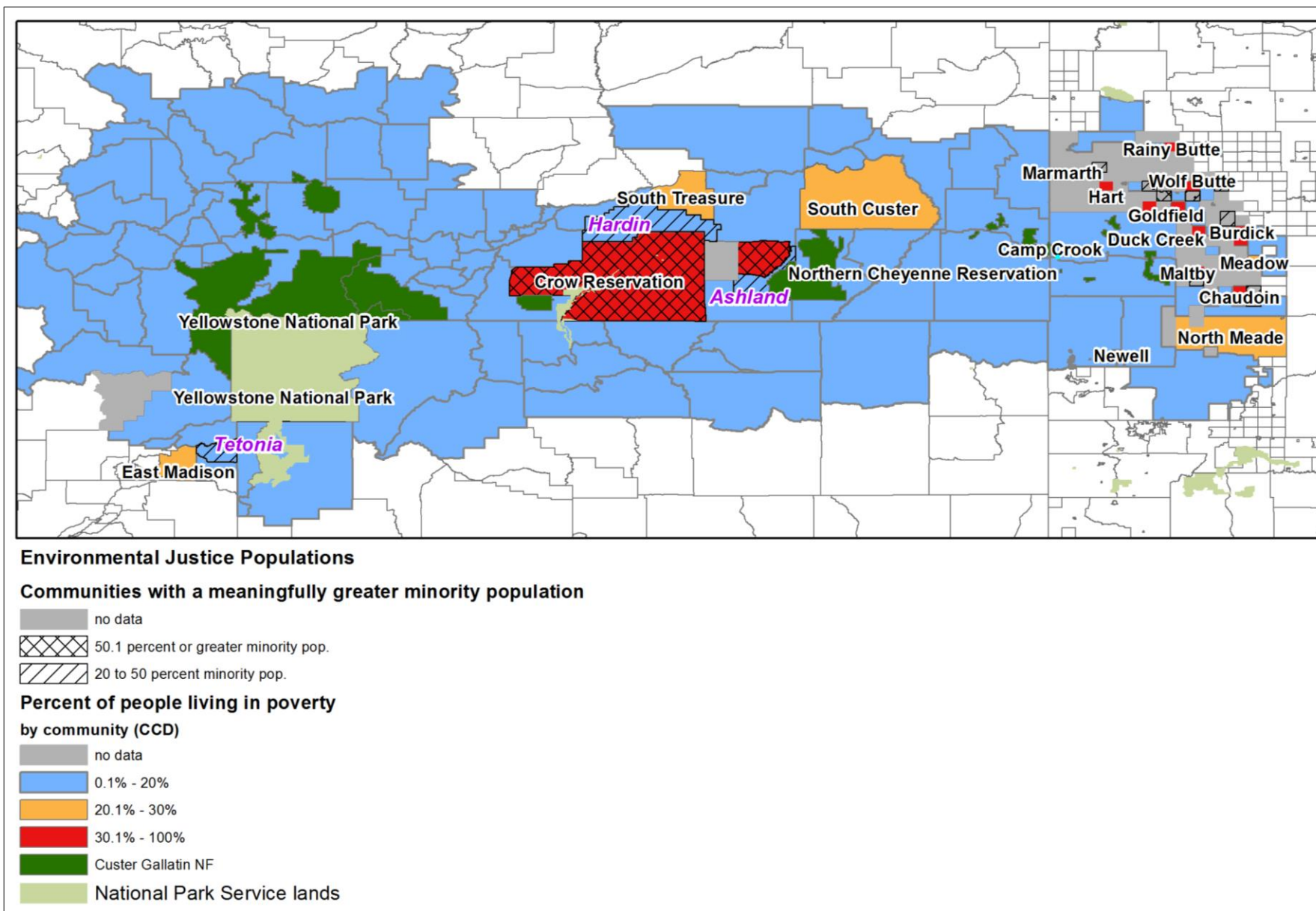
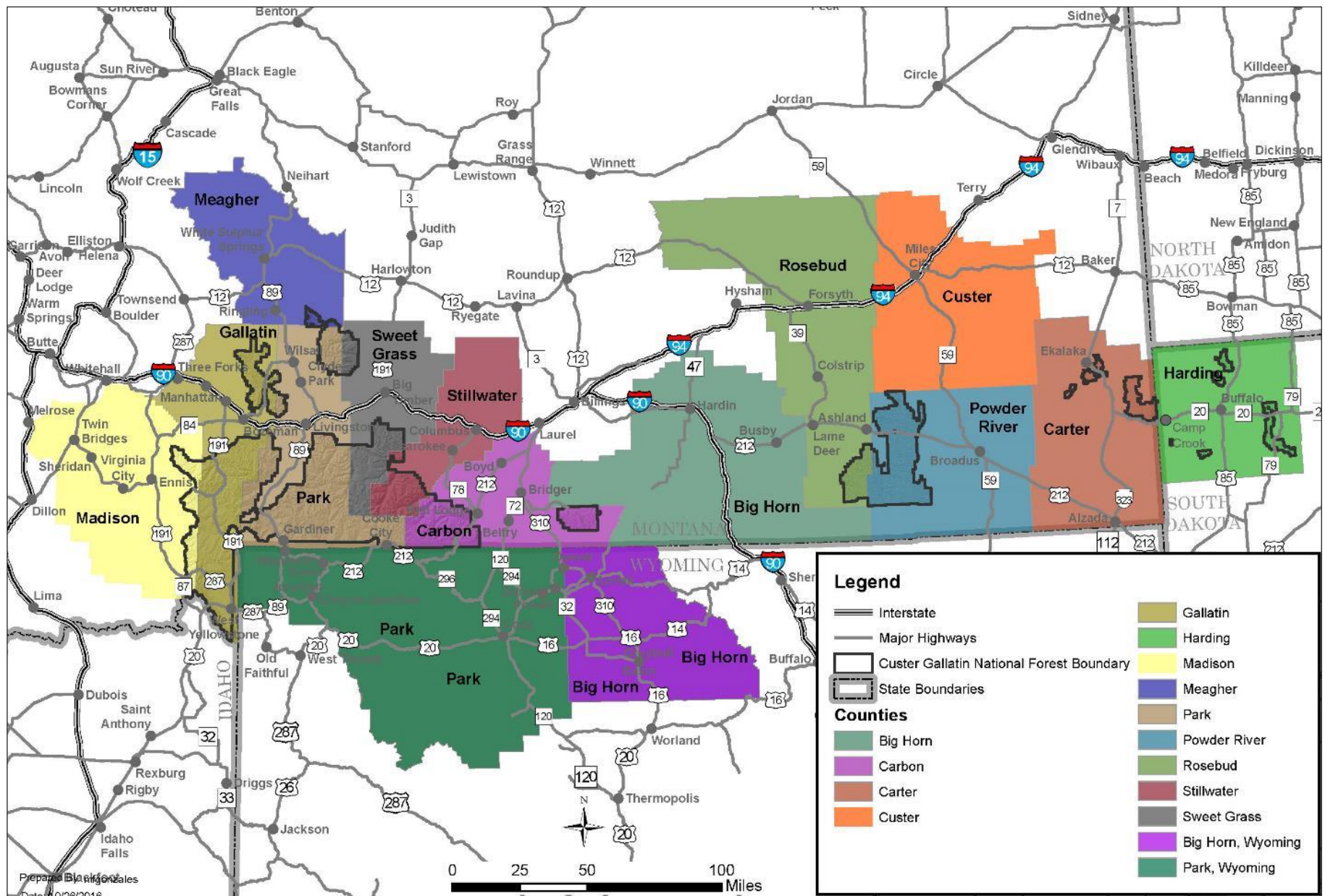


Figure 12. Environmental Justice populations across the Custer Gallatin social area of influence

Data Source: U.S. Census 2015; Map Source: U.S. Forest Service Northern Region 2016



Carbon County, Montana

Carbon County connects the east and west side of the Beartooth Ranger District and has a significant percentage of residents who work on or for the Custer Gallatin. This rural county is a popular tourist destination, particularly the county seat of Red Lodge. The population, which has grown steadily since 1990, is approximately 11,000. Relative to the other counties described, Carbon County has a high percentage of older residents: About 22 percent of the population is over 65 and the median age is about 49, which is 10 years higher than the statewide average.

The workforce is relatively specialized in cattle ranching, real estate and government services, but almost 70 percent of county residents commute to jobs in other counties. Most jobs are related to travel, recreation, tourism, beef, real estate and natural resource management. Key economic issues that have been identified for Carbon County include high infrastructure maintenance costs, a lack of affordable housing, a lack of job growth, an aging workforce, a declining tax base, and seasonal business levels.

Carbon County has a relatively high number of residents who visit the national forest for recreation. On the county's west side, the Custer Gallatin offers diverse recreation opportunities including a ski area and a popular scenic roadway leading into Yellowstone National Park. On the east side, the Pryor Mountains offer a variety of multi-use resources.

Carter County, Montana

Located on the southeastern border of Montana, Carter County is rural and relatively isolated in terms of distance to major economic or transportation hubs. The county contains part of the Sioux Ranger District and includes a small percentage of residents who work on or for the national forest. The population has shrunk over the past 40 years to less than 1,200. Relative to the other counties described, members of this population are among the oldest on average: About 27 percent is over 65. Major employment categories are farming, ranching and elderly care. More than 20 percent of residents lacked health insurance in 2013.

Gallatin County, Montana

Located on the northwest end of the Custer Gallatin area, Gallatin County is a population center of wealth, travel and tourism relative to the other counties described. The county seat of Bozeman is a regional transportation, professional services and retail center. The county's population has grown from less than 33,000 in 1970 to more than 100,000 today. Gallatin County is nearly 45 percent national forest lands and offers the most developed infrastructure and the most easily accessible recreation opportunities of the counties described. Economic diversification and outside investment has increased housing costs and development in the wildland-urban interface. County challenges include expanding infrastructure and rising demands from a fast-growing economy, population and tourism industry.

Harding County, South Dakota

Harding County lies near the eastern edge of the national forest and includes part of the Sioux Ranger District. The area is extremely rural and isolated in terms of distance to major economic or transportation hubs. The county's population is around 1,200. A gradual population decline recently reversed in 2010 due to oil and gas development, but fewer than

100 permanent residents have moved to the county in the last four years. The workforce is largely employed in ranching, mining, and oil and gas development. The county has relatively high poverty levels, partly due to a lack of economic opportunities.

Madison County, Montana

Located on the western end of the Custer Gallatin, Madison County is mostly rural, with a strong recreation economy helped by several popular trout fishing areas. The population has steadily increased over the past 40 years to nearly 8,000 people, nearly 25 percent of whom are 65 or older. Employment opportunities are greatest in travel, tourism and recreation services, cattle ranching, government services and real estate. The county's challenges include rising housing and land costs, an aging workforce and rising elderly care needs.

Meagher County, Montana

Located between Bozeman and Helena, Meagher County includes a small amount of the Custer Gallatin as well as the Helena-Lewis and Clark National Forest. Compared to the other counties described, Meagher County receives the highest percentage of its county tax revenue (25 percent) from Federal land payments. This is mainly due to a limited tax base. Meagher County has had a population of about 1,800 since 2000, with a relatively high average age. Although the county is near a few population centers, it's relatively rural. Employment is mainly in cattle ranching, crop farming, healthcare and legal services. Due to pressures from surrounding counties, Meagher County mortgages now have the highest ratio of housing prices to household income in the economic analysis area.

Park County, Montana

Located east of the Bozeman metropolitan area, Park County is in the middle of the Gallatin National Forest. Although largely rural, the county is a popular travel destination and luxury home area, known for its world-class trout fishing and proximity to Yellowstone National Park. The county has maintained a population of approximately 16,000 over the last decade. The top employment opportunities in Park County are in real estate and travel and recreation services, followed by government services, beef cattle ranching and religious organizations. Compared with other rural counties in the study area, Park County has a relatively diverse economy that includes healthcare services, restaurants and retail.

Powder River County, Montana

Powder River County includes part of the Ashland Ranger District. The county is rural and has a population of approximately 1,700. The main industries are cattle ranching, government services, farming, and support activities for oil and gas. Powder River County is mainly rural and agricultural, with most of the land used for grazing. There is limited oil and timber production, though these resources are abundant. Since 1954, farm acreage has ranged between 1.5 and 1.7 million acres. In this time, the number of ranches has decreased and their average size has increased, reflecting a national mechanization trend and a lack of ranch workers.

Rosebud County, Montana

Rosebud County intersects the western side of the Ashland Ranger District. The county is rural and home to the Northern Cheyenne Indian Reservation. The population is relatively

young and diverse, with approximately one-third of the residents having Native American heritage. The county struggles with educational levels and poverty. Relative to the other counties described, Rosebud County has the second highest public assistance, uninsured and non-working percentages. The workforce is relatively specialized in government services, cattle ranching and coal mining. Custer Gallatin sites that are culturally significant to the Northern Cheyenne include the Tongue River Breaks in the Ashland District.

Stillwater County, Montana

Stillwater County has a significant percentage of residents who work on or for the national forest. The county is rural and has a population of approximately 9,000. Relative to other counties, Stillwater County has very little Federal land. Commercial trade, manufacturing, tourism, mining and precious metals processing are its economic base. The largest employers are Stillwater Mining Company and Montana Silversmiths.

The Stillwater County Economic Development Plan has set development of the county's natural resources as a priority, especially minerals and agricultural products. Conservation measures are supported for soil, water, air and other significant natural resources. Recreational development and expanding recreation tourism and travel services for economic benefit are also a priority.

Sweet Grass County, Montana

Sweet Grass County has many residents who work on or for the national forest. The County is rural and has a population of approximately 3,600. Relative to other counties, Sweet Grass County maintains a workforce specialized in agriculture, mining and other extractive industries. Stillwater Mining is the largest employer in the county.

Looking Forward: Conclusions and Concerns

While the Custer Gallatin covers a wide landscape, its social, economic and environmental influence is far greater: The national forest's impact extends to multiple counties, each with a unique mix of values, priorities and concerns. Through the Custer Gallatin assessment process and eventual forest plan creation, as well as continued social and economic research, Custer Gallatin planners have the opportunity to make the new, consolidated forest plan more wide-ranging and consistent than the individual Custer and Gallatin plans and to recognize the role of the national forest in supporting local economies through commodity production, recreation and tourism.

Additional Information

Larson, J. and R. Rasch. 2016. Assessment for Forest Plan Revision – Social, and Economic Conditions Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802

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Rangelands and Grazing

*"I do not believe there ever was any life
more attractive to a vigorous young fellow
than life on a cattle ranch."*

- Theodore Roosevelt

A History of Grazing

Federally managed grazing on national forest lands is nearly as old as the National Forest System itself. Just six years after the Forest Reserve Act of 1891, Congress authorized grazing on these lands as long as it did not injure forest growth. In 1905, when the Forest Service was established, the initial policy stated: "The Forest Service will allow the use of the forage crop of the reserves as fully as the proper care and protection of the forests and the water supply permits. In new forest reserves where the livestock industry is of special importance, full grazing privileges will be given at first, and if reduction in number is afterwards found necessary, stockmen will be given ample opportunity to adjust their business to the new conditions."

The rules and regulations have changed over the years but grazing has continued. According to the Multiple-Use Sustained-Yield Act of 1960, national forests "shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes." Today, the Forest Service seeks to conserve the rangelands' rich natural resources and support the communities that depend on those resources. While grazing is an important use, the Forest Service balances that use with other needs, including management improvement and protecting soil, water and vegetation.

Although grazing levels on the Custer Gallatin have varied over time, they're much lower than they used to be. Today, about 22 percent of Custer Gallatin lands consist of "primary rangeland"—where livestock typically graze within grazing allotments. About 86 percent of the Ashland and Sioux Districts is primary rangeland, compared to only about 6 percent of the rest of the national forest. Roughly 36,200 head of cattle, 550 horses and 400 domestic bison are permitted to graze at various times throughout the year on Custer Gallatin lands and associated private lands.



Cattle graze in the Long Pines unit of the Sioux District (photo by Denise Zolnoski)

Benefits of Custer Gallatin Rangelands

These rangelands have many economic, social and cultural benefits. For example, people profit from the sale of food, fiber, biofuels, animal feed and biochemicals made from

rangeland resources. And in many places, rangelands and ranching are tied to local cultural and historical identity. Rangelands also generate intangible benefits related to wide open natural spaces, such as the pleasure that people take in observing plants and wildlife, studying natural systems, and hunting and fishing. Many rural communities continue to be dependent upon ranching for their economic livelihood. Without the national forest, particularly the Ashland and Sioux Districts, many local grazing permittees would have difficulty staying in business.

Management Details

For more than 30 years, the Gallatin forest plan goal for rangelands has been to provide improved forage management to maintain or enhance the rangeland environment. The Custer forest plan goal for rangelands is to achieve a range of beneficial uses of rangeland resources, including productive soil, healthy vegetation and clean water. Special grazing considerations and management occur in certain areas such as bison tolerance zones, the grizzly bear recovery zone, critical wildlife habitat and designated wilderness areas.

Special grazing considerations and management occur in certain areas such as bison tolerance zones and designated wilderness.

There are 216 grazing allotments on the Custer Gallatin, 199 of which are in use. The 18 vacant allotments are mostly in the Yellowstone and Gardiner Ranger Districts. Since 1986, 59 allotments have been closed—all on the Gallatin National Forest—usually because of longtime vacancies, logistics and economics of operations, limited access, ownership changes from land exchanges, failing infrastructure or wildlife considerations.

Allotments are managed using allotment management plans and annual operating instructions. These plans and instructions, which can be changed as needed, include details such as the number of livestock permitted on national forest land, the dates they can be there, and required infrastructure to be maintained, such as fences and water developments. As part of the Act's requirements, the Forest Service also monitors allotments for compliance. More than 90 percent of Custer Gallatin allotments have completely incorporated forest plan standards and have been reviewed for compliance with the National Environmental Policy Act. The rest have been scheduled for revision over the next 10 years. As Table 2 and the following maps show, most active allotments are on the Ashland and Sioux Ranger Districts.

Table 2. Number of active grazing allotments by Custer Gallatin ranger district (2016)

Managing Ranger District	Number of Active Allotments
Ashland	60
Sioux	53
Yellowstone	41
Beartooth	22
Bozeman	21
Hebgen Lake	2

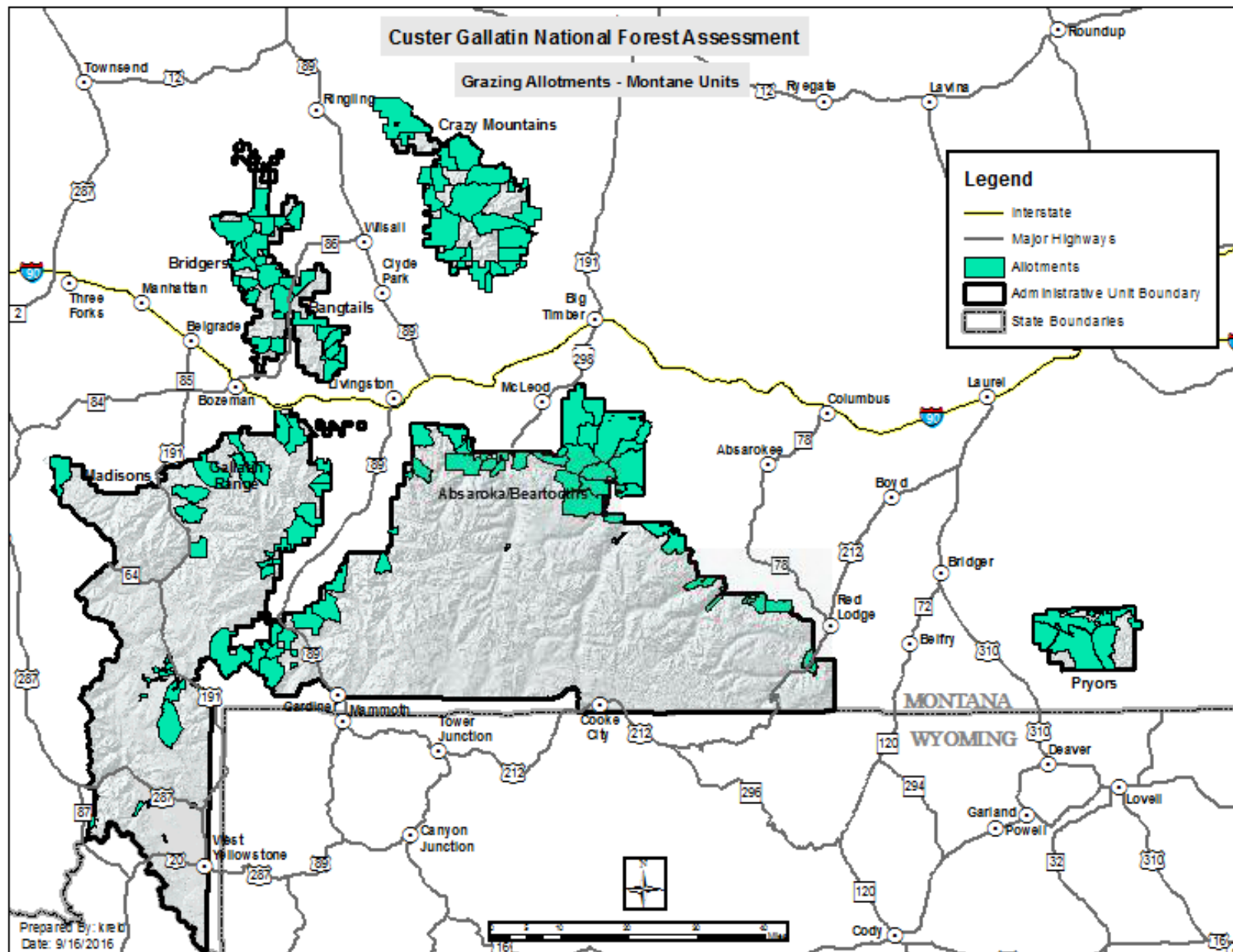


Figure 14. Grazing allotments on the west side of the Custer Gallatin National Forest

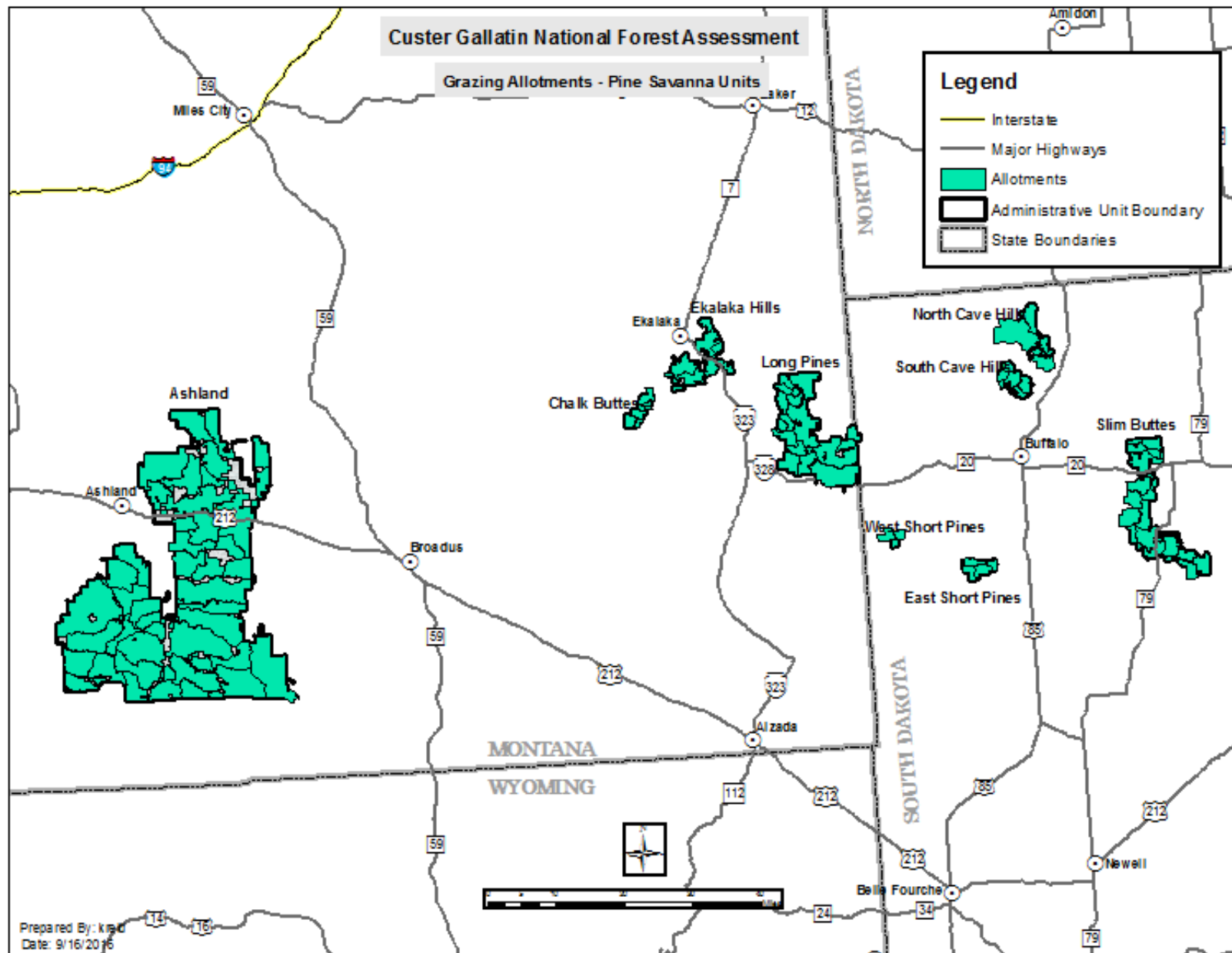


Figure 15. Grazing allotments on the east side of the Custer Gallatin National Forest

Current Conditions

Past land use and management actions have influenced the rangeland conditions we see today. This includes overuse from unmanaged livestock grazing from the 1880s to 1930s. For example, Pryor Mountains grazing records indicate that current forage removed by permitted livestock is about 14 percent of early-1900s levels. Other changes since then include allotment closures, livestock use reductions, fencing installations, distribution improvement practices and breaks in use.

Rangelands in grazing allotments can be categorized into three broad groups: uplands (grasslands and shrublands), riparian areas (streamside vegetation and wetlands) and green ash woodlands. Potential ecosystem stressors to these areas include invasive plants, grazing, wildfire, periodic drought and a warmer climate. Over time, desirable species have become more widespread and less desirable species have been reduced in uplands. While Custer Gallatin upland conditions today are satisfactory overall, there are places where conditions can be improved.

Custer Gallatin upland conditions today are generally satisfactory, although there are places where conditions can be improved.

Areas prone to livestock concentration typically occur in riparian and green ash woodlands. In recent studies, 71 percent of riparian survey sites were found to be in functioning condition (meaning conditions are more resilient to ecosystem stressors), 27 percent were found to be functioning but at risk (meaning that improvement could be made to transition back to functioning condition) and 2 percent were nonfunctional (meaning that ecological processes have degraded beyond the point of self-repair). In recent surveys of green ash woodland sites on the Ashland and Sioux Districts, 19 percent were found to be functioning, 61 percent were functioning but at risk, and 20 percent were nonfunctional. Because of lower stocking rates (the number of animals permitted on a given amount of land over a certain period of time), breaks in grazing use and other management tools, conditions in these areas are generally improving.

Management Concerns

Although many management changes have been made over time to improve rangeland conditions, management prescriptions will continue to be fine-tuned. By continually monitoring conditions and making incremental changes, managers can help restore and maintain ecosystem health and promote resiliency to drought, wildfire and other stressors. Periodic drought will continue to require temporary management shifts such as reduced stocking rates and grazing durations.

Permitted livestock use may decline slightly in the future due to loss of forage brought about by conifer and invasive weed spread into grasslands and shrublands. There may also be management constraints to protect threatened, endangered or other at-risk species. Future large wildfires will likely increase costs associated with fence and water development maintenance. In these situations, permittees will need to acquire forage elsewhere until post-fire recovery and fence and water repairs occur.

Looking Forward: Conclusions and Concerns

Grazing is one of the longest uses of the Custer Gallatin National Forest and it's very important to many ranchers and nearby communities. Although the individual Custer and Gallatin forest plans both contain still-relevant direction for rangeland and grazing management, the forest plan revision process provides an opportunity to make the overall plan more consistent and integrated with other national forest objectives. The goal is to balance grazing needs with sustainability, habitat protection and other national forest obligations, with a special focus on sensitive and biologically important areas such as riparian areas and green ash woodlands. To help resource management and this review process, information needs include continuing monitoring and analysis of plant composition and rangeland trends for each grazing allotment.

Additional Information

Reid, K. 2016. Assessment for Forest Plan Revision – Permitted Livestock Grazing Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Timber

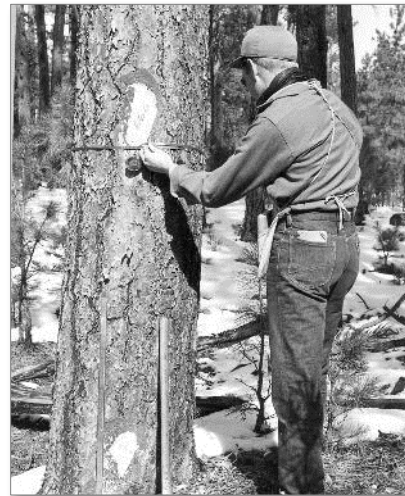
"Conservation means development as much as it does protection."
- Theodore Roosevelt

Conservation and Sustainability

In many ways, the history of western U.S. timber mirrors the history of the United States' expansion westward toward the Pacific Ocean. American timber helped build our nation's railroads, mines, houses and businesses. Timber, which is defined as wood that is used for building and carpentry, fed the American industrial revolution and enabled shipbuilding and other needs during two world wars.

In the early days of our nation's westward expansion, natural resources seemed unlimited. But in the late 1800s and early 1900s, the concept of conservation began to have a bigger effect on Federal land policy. Federal agencies and divisions such as the Department of Justice's Land and Natural Resources Division and the Department of Agriculture's Forest Service were created to study and manage the country's national resources to ensure a steady supply of clean water and timber.

Over the years, the Forest Service came up with several ways to classify and manage the country's timber resources. One of the most important management metrics is long-term sustained yield capacity, which estimates the maximum volume of timber that can be harvested every year in a specific area without reducing the availability of timber over time.



Timber harvesting operations on the Hyalite Creek area and a timber worker measuring the diameter of a ponderosa pine in the late 1940s (photos courtesy of the National Museum of Forest Service History)

How Conditions Have Changed

The most recent allowable sale quantity direction for Custer Gallatin timber were made official in 1986 and 1987, as part of the Custer and Gallatin forest plans. (Allowable sale quantity is a Forest Service estimate of the amount that could be sold based on factors such

as demand and environmental conditions.) The two plans also include general goals and direction, which differ in their scope and priorities.

Obviously, much has changed since then. One significant change is that wildfire has become a more serious issue due to climate change and past fire suppression. A related change has been the recent severity of insect infestations and disease. Insect infestations have included mountain pine beetle, pine engraver, Douglas-fir beetle and western spruce budworm. Other changes include increased social concern regarding timber harvesting on public lands and the addition of more than 72,000 additional acres of Gallatin National Forest land in the 1990s. Considering all these factors, along with the merger of the Custer and Gallatin National Forests in 2014 and a recent resurgence in the U.S. housing market, it's safe to say that the Custer Gallatin's timber management plan could benefit from updated policies and forest statistics.

While new timber goals and objectives will be considered as part of the Custer Gallatin forest plan revision, Custer Gallatin managers also need updated metrics on the condition of the National Forest's timber resources. These resources have not been comprehensively evaluated in the past 29 years due to environmental changes, budgetary constraints and other concerns.

Taken together, the 1986 and 1987 forest plans established an allowable sale quantity of 24.5 million board feet of timber products and fuelwood per year. The average volume sold from 1987 to 2015 has been only 10.5 million board feet. While this average has fallen over the years, as shown below in Table 3, Custer Gallatin timber harvests over the past 40-plus years have consistently fallen well short of the allowable sale quantity. This was especially true during the recent recession and housing collapse, which together lasted from 2006 to 2012.



Timber harvesting in the Ekalaka Hills area of Montana, Sioux District

Table 3. Average volume of Custer Gallatin timber products sold, in millions of board feet, excluding fuelwood (1980-2015)

Decade	Custer Average	Gallatin Average	Total Average
1980-1989	3.9	16.5	20.4
1990-1999	1.8	6.2	8.0
2000-2009	3.2	2.0	5.2
2010-2015 (partial decade)	2.5	2.3	4.8

Fuelwood, which is not included as part of the allowable sale quantity, has accounted for between 500,000 and 1 million board feet per year on average since 1980. Christmas trees are another revenue-producing wood product from the Custer Gallatin, but this non-timber category is relatively minor in terms of volume.

Local Resources and Economic Impact

The economic importance of the Custer Gallatin's timber is concentrated in the 11 counties in Montana and South Dakota that contain the national forest, plus four counties that contain infrastructure that processes timber coming off the Custer Gallatin. These four counties are Powell and Broadwater in Montana and Crook and Lawrence in South Dakota.

According to Forest Service estimates, of the 11 counties that contain the Custer Gallatin National Forest, Gallatin County has the highest percentage of the 627,815 national forest acres that the Forest Service has previously classified as "tentatively suitable" for timber harvesting. According to past Forest Service estimates, 14 percent of Gallatin County fits this classification, followed by Powder River County with nearly 6 percent. All nine of the other counties have less than 5 percent each.

Maps of tentatively suitable Custer Gallatin land are shown on the following pages. These maps show that although most of the Custer Gallatin's distinct land areas have tentatively suitable land, the majority of this land is in two landscape areas: the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains area and the Ashland District.

Wildfire and Its Effects Since 1980

The increased frequency and severity of wildfire is easily one of the most significant factors to affect the Custer Gallatin lands since they became part of the National Forest System. As Table 4 indicates, since 1980 nearly one-third of the Custer Gallatin's tentatively suitable timber landbase has been burned by wildfire. The Ashland and the Sioux landscape areas were affected most, with more than two-thirds of their tentatively suitable landbase burned. Over time, promoting the development of more varied forest conditions may lead to healthier forest conditions and more stable timber output capability.

Table 4. Custer Gallatin acres burned by wildfire (1980-2015)

Landscape Areas	Total Acres Burned	Tentatively Suitable Acres Burned	Percent of Tentatively Suitable Acres Burned
Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains	425,594	51,385	15%
Bridger, Bangtail and Crazy Mountains	3,386	1,107	2%
Pryor Mountains	5,737	868	3%
Ashland District	300,914	102,763	70%
Sioux District	74,128	39,277	67%
Totals	809,759	195,399	31%



Figure 16. Tentatively suitable timber land on the west side of the Custer Gallatin

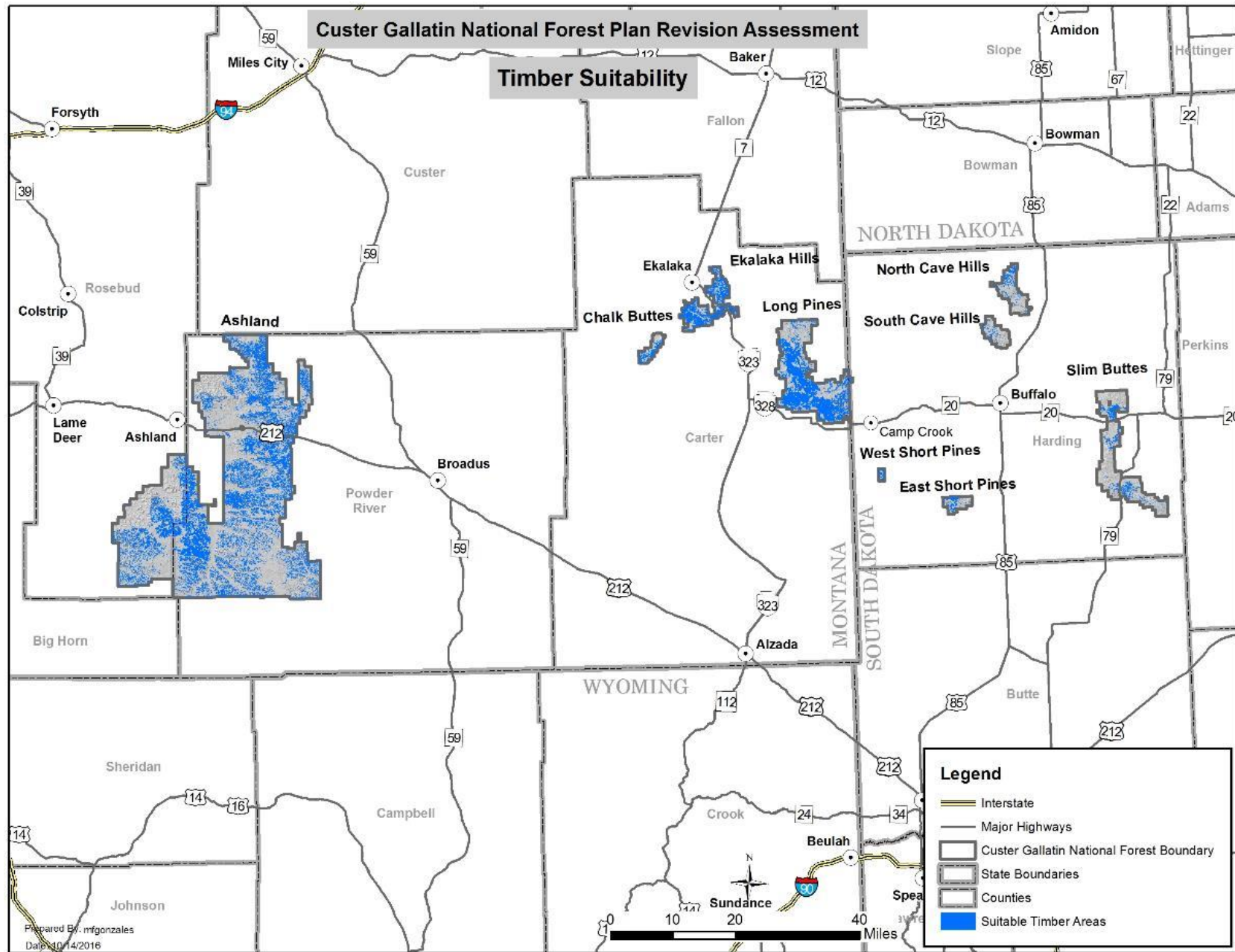


Figure 17. Tentatively suitable timber land on the east side of the Custer Gallatin

Improving Conditions for Timber Production

An important part of the Forest Service's directive is to maintain or improve conditions in national forests. In the Custer Gallatin, these efforts have included reforestation, harvesting (removing some or all of the trees in an area to make room for regeneration or to improve conditions for remnant trees), prescribed burns and fuel reduction. In recent decades, these techniques have been used partly in response to disease, insects, windthrow (trees uprooted or broken by wind) and fire damage, but they also affect long-term timber sustainability. Figure 18 and Figure 19 show how the Custer Gallatin's use of these techniques have changed over time and how they peaked in the 1980s, when timber harvesting was at its highest levels of the past 40 years.

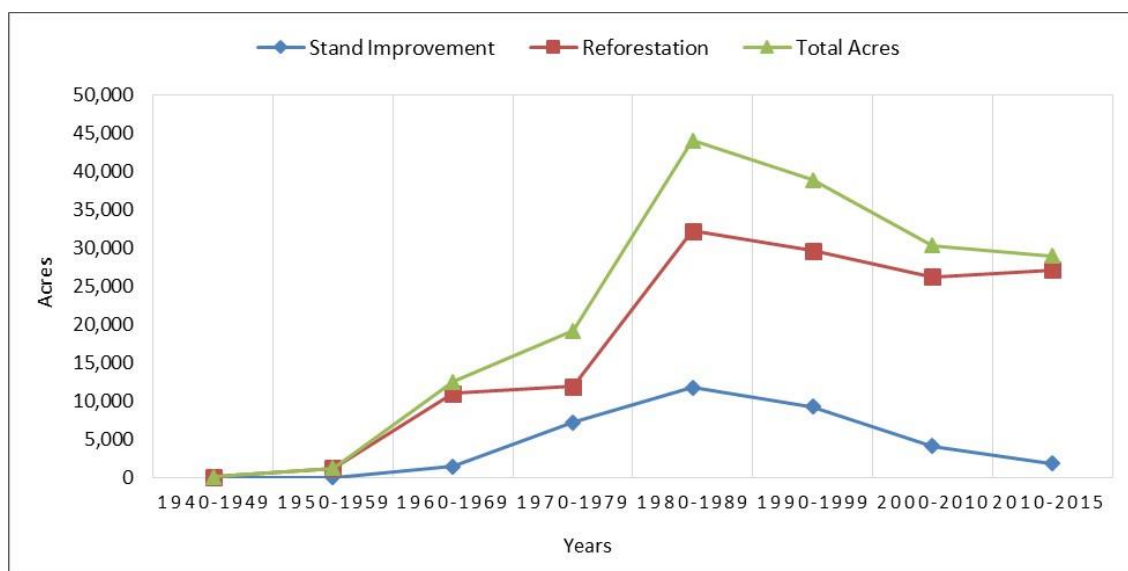


Figure 18. Custer Gallatin acres of stand improvement and reforestation activities by decade (1940-2015)

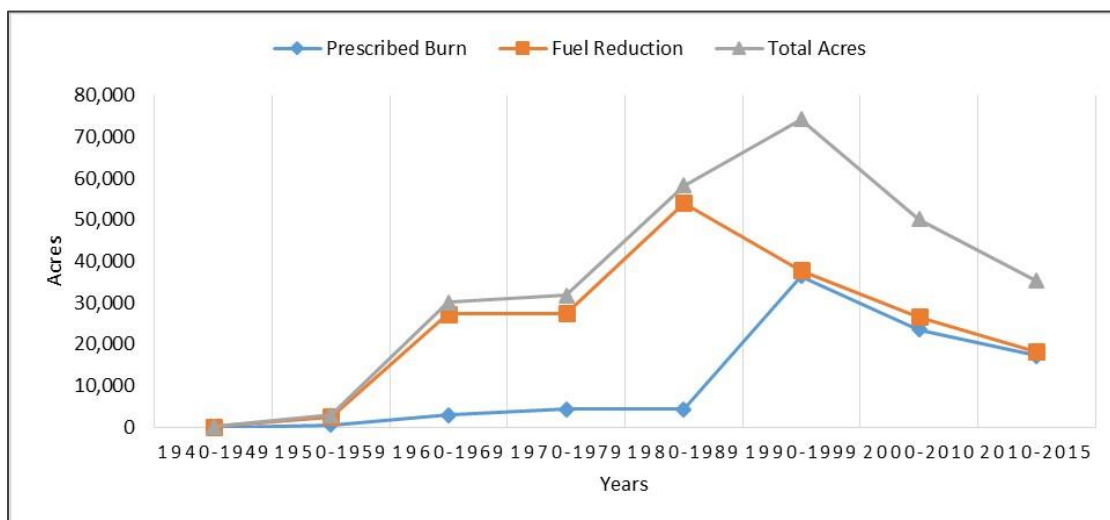


Figure 19. Custer Gallatin acres of prescribed burns and fuel treatments by decade (1940-2015)

Looking Forward: Conclusions and Concerns

Much has changed since the Custer Gallatin's timber resources were evaluated and classified, including climate, fires, insect epidemics, land acquisition and the administrative merger of the Custer and Gallatin National Forests. In addition, there is now a better understanding of how forest harvesting can be used as a tool to restore habitat and ecosystems. As a result, the Custer Gallatin's timber resources are due for updated resource evaluation and a revised management plan. This will help Custer Gallatin managers evaluate timber harvesting decisions in context with other considerations, including wildlife habitat, recreation and scenery.

Additional Information

Thornburgh, D. 2016. Assessment for Forest Plan Revision – Timber Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Renewable and Nonrenewable Energy and Mineral Resources

*“Conservation means the wise use of the earth and its resources
for the lasting good of men.”*

- Gifford Pinchot, first Chief of the U.S. Forest Service

More Than A Century of Development

The year 1872 had several milestones for the western states. This year marked the death of Horace Greeley, the man who popularized the saying, “Go west, young man.” It also was the year that popular western adventure novelist Zane Grey was born. Grey’s books, including *Riders of the Purple Sage*, helped shape the way many people viewed the west. And it was during this 12-month period that Yellowstone Park became the first national park in the world.

Another event from this year that has had lasting implications was the signing of the General Mining Law of 1872. This law made it legal for most of the country’s federally owned lands to be explored and mined for hardrock minerals. According to the law: “Except as otherwise provided, all valuable mineral deposits ... shall be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by citizens of the United States and those who have declared their intention to become such.”

“Well, it’s complicated ...”

More than 140 years later and despite many amendments, this law is now one of many others that direct how Federal lands should be managed for mineral and energy extraction. Here are a few of the others:

- Organic Administration Act of 1897
- Mineral Leasing Act of 1920
- Mining Act of 1955
- Wilderness Act of 1964
- Mining and Minerals Policy Act of 1970
- National Environmental Policy Act of 1969
- Clean Water Act of 1972
- Resource Conservation and Recovery Act of 1976 (which amended the Solid Waste Disposal Act of 1965)
- Federal Land Policy and Management Act of 1976
- National Materials and Minerals Policy, Research and Development Act of 1980
- Energy Policy Act of 2005

If this sounds complicated, it’s because it is. Other complicating factors include economics, environmental policies, cultural shifts, recreational demands, and national and local politics.

In addition, Custer Gallatin energy and mineral resources management extends far beyond current and future mining and quarrying. It also includes exploration drilling, geologic hazards management, abandoned mine cleanup projects, hydroelectric power, and energy transmission corridors. Certain geologic characteristics are also included. One example is karst topography, a land type characterized by sinkholes, underground drainage systems and caves. Underwater drainage systems can have a close relationship with rivers, streams

and public water supply, while cave systems can have features of cultural and environmental significance such as fossils, protected animal habitat and petroglyphs (ancient cave art).

Who's In Charge of What

When considering mineral exploration and development on National Forest System lands, it's important to remember that the Forest Service shares administrative responsibilities with the Bureau of Land Management (BLM). The BLM is mainly responsible for administering U.S. mining laws and mineral leasing acts, while the Forest Service is responsible for managing the occupancy and use of the surface as well as the disposal of certain mineral materials.

This administrative structure applies to about two-thirds of Custer Gallatin lands. The main exceptions are the Absaroka-Beartooth Wilderness (more than 917,000 acres) and the Lee Metcalf Wilderness (nearly 134,000 acres), which are designated wilderness areas where new mineral and energy development is restricted. Other land use guidelines depend on whether the land is in the public domain—that is, land that has never left Federal ownership or jurisdiction. Approximately 87 percent of the Custer Gallatin is in the public domain. The rest, which has been added through purchase, condemnation or exchange, may or may not include mineral development rights.

Custer Gallatin Mineral and Energy Resources

Covering more than 3 million acres spread across more than 400 miles, the Custer Gallatin has mineral and energy resources that are both varied and enormous. Since the 1860s, Custer Gallatin lands have been successfully mined, quarried or otherwise developed to remove gold, silver, copper, lead, zinc, arsenic, tungsten, chromium, palladium, platinum, limestone, coal, oil, gas and methane. (Common industrial materials such as construction aggregate and rip rap are quarried, but these materials are usually used for public rather than commercial projects.)

Currently, there are about 118,000 acres of authorized leases for resources such as oil, gas and coal on the Custer Gallatin, including about 18,000 acres on the Sioux and Beartooth Districts. But recent social changes have slowed new mineral and energy development in most parts of the Custer Gallatin. For example, more than 100,000 acres of authorized leases on the Gallatin portion of the national forest have been suspended from further development following legal challenges. In addition, mining claims have fallen since 2000 because of mining claim rule changes and increases in fees charged by the BLM.

Recent social changes have slowed new mineral and energy development in most parts of the Custer Gallatin.

Despite these changes, authorized leases continue to have a significant impact on local social and economic conditions. And while many resource sites were identified and claimed more than 100 years ago, there may be others that have yet to be discovered. With recent and ongoing exploration, production and technology improvements, it's possible that there will be mineral and energy proposals in the future.

Examples of Custer Gallatin mineral, energy and geologic resources can be found below, listed by landscape area.

Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains

The Stillwater Complex. With mining operations near Nye and Big Timber, the Stillwater Mining Company is the only primary producer of platinum and palladium in the United States. Gold, silver, copper, chromium and rare earth minerals can also be found in this area. Many smaller dredging and exploration projects can be found in the national forest's Yellowstone, Gardiner, and Beartooth Districts.



Stillwater Mining Company site

The New World Mining District. Located near Cooke City, the former New World gold, silver, copper, lead and zinc mine sites are just a few miles upstream from Yellowstone National Park. The Forest Service acquired the mineral rights to this land in 1996 and 2010. A \$22.5 million fund has helped to clean up the area's hard rock mining wastes and acid discharges, although site monitoring and maintenance continues.

Mystic Lake Hydroelectric Dam. Located on the West Rosebud River, the Mystic Lake Dam hydroelectric plant has been in operation since 1924.

Limestone Caves. Many of the limestone and travertine formations throughout this area contain caves, many of which include natural water features or are habitat for State- or Forest Service-designated sensitive species such as various bat species. Caving activities have been restricted here and elsewhere, partly to reduce possible transmission of white nose syndrome, a disease that has killed millions of bats across North America since 2006. As with caves across the Custer Gallatin, many have been damaged by human contact and misuse.

Bridger, Bangtail and Crazy Mountains

Bangtail Botanical and Paleontological Special Interest Area. Located in the Bozeman Ranger District, this area features fossils of mammals that lived approximately 2 million years ago.

Pryor Mountains

Uranium Deposits. Large areas of the Pryors consist of a limestone-based landscape that contains many caves, several of which have been mined for uranium minerals. The largest deposits were found on the western flank of Big Pryor Mountain. The Old Glory, Sandra and Blasted Cave mines are on land administered by the Forest Service.

Big Ice Cave. Ice caves, which are simply natural caves that contain significant amounts of year-round ice, are highly sensitive to their surrounding environment and can help scientists measure changes in climate and air quality over long time periods.

Ashland District

Coalbed Methane. This area is well known for its coal and coalbed methane gas resources. While no coalbed methane extraction has occurred on the national forest, there have been extraction operations on nearby lands. Demand has fallen in recent years, so near-term coalbed methane extraction proposals in this area are seen as unlikely.

Sioux District

North Cave Hills. This culturally significant area includes the Riley Pass abandoned uranium mine Superfund cleanup site, along with several caves with rock art and bat populations. This area is also known to contain significant oil, gas, uranium and coal resources. The Lonesome Pete abandoned uranium mine in the nearby South Cave Hills area is a potential Superfund site.



Cleanup efforts at the former Riley Pass mining sites

Looking Forward: Conclusions and Concerns

The Custer and Gallatin forest plans from the 1980s have helped to prevent or reduce large-scale unacceptable resource effects while providing opportunities for renewable and nonrenewable energy and mineral resource production. However, while these plans are sometimes inconsistent, they do not reflect new laws and regulations, and they lack direction related to many geologic hazards such as landslides, sinkholes, abandoned mines and radioactive materials. A revised and combined forest plan provides the opportunity to unify and update national forest management direction in light of new laws, regulations and environmental impact statements. In addition, Custer Gallatin managers would benefit from increased research on several areas related to national forest energy, minerals and other subsurface geologic and cultural resources. These research opportunities include:

- likely geologic resource locations
- health and safety implications of mineral extraction
- projected demand for various natural resources
- cave and karst inventories (only the Pryor Mountains has had a completed inventory)
- fossil location inventories
- petroglyph location inventories
- oil and gas leasing environmental impact statements (only the Beartooth Mountain area and the South Dakota portion of the Sioux District have recent environmental impact statements)

Additional Information

Pierson, P. 2016. Assessment for Forest Plan Revision –Renewable and Nonrenewable Energy and Mineral Resources Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Existing Designated Areas

*“To those devoid of imagination,
a blank place on the map is a useless waste;
to others, the most valuable part.”*

- Aldo Leopold

The Blank Places On the Map

While the Custer Gallatin has a high number of visitor centers, resorts, campgrounds and ski areas, a big part of the national forest’s presence—both literally and figuratively—is the undeveloped land that can be found across the national forest. The Absaroka-Beartooth Wilderness alone accounts for more than 920,000 acres on the Custer Gallatin, which is more than 30 percent of the Custer Gallatin’s total land area. Covering a much smaller area but not really “blank places on the map” are designated trails, roads and a few other unique sites that have received special designations to help preserve them for future generations.

These “designated areas” have a wide variety of public benefits, including ecological, geological, scientific, educational, scenic and historical benefits. Many of these areas also protect air quality, water quality, wildlife habitat, unique wild plant and animal species, and provide a unique legacy to future generations. Designated areas provide scenic beauty of wild landscapes, the knowledge that wilderness is being protected, and the opportunity for solitude and for wilderness recreation experiences. They also preserve nature for scientific study and spiritual inspiration. Many of these areas have inspired controversy over the years: While some people would like to see more areas protected as designated areas, others have expressed interest in reconsidering existing designations and reducing protection levels.



Wild horses in the Pryor Mountain Wild Horse Range (photo courtesy of Terry Jones)

Current Forest Plan Direction and Conditions

Federally managed land has many different land classifications, with a wide range of protection levels, management requirements and opportunities for recreation and community connection. To maintain wilderness quality and opportunities for solitude, management techniques have included restrictions on outfitter and guide operations, camping, campfires and group sizes. Depending on the classification, various laws and regulations determine how these different categories are managed. Many of these areas on the Custer Gallatin were designated 20, 30 or even more than 40 years ago, and much has changed since then: visitation rates, local land ownership, climate, vegetation, wildfire characteristics and even social values. Technology improvements have made backcountry recreation more accessible.

On the following pages are four maps of Custer Gallatin designated areas, followed by individual area descriptions. Designated national trails are listed first, followed by other designated areas listed alphabetically by type. More than two-thirds of the national forest is designated in one or more of the classifications discussed below.

Designated Wilderness

According to the Wilderness Act of 1964, designated wilderness is “an area of undeveloped Federal lands retaining its primeval character and influences, without permanent improvements or human habitation, which is protected and managed to preserve its natural condition.” These areas receive the Federal Government’s highest level of land protection. Designated wilderness management on the Custer Gallatin is based on the 1964 Wilderness Act, Forest Service regulations and directives, and the Custer and Gallatin forest plans, both of which emphasize opportunities for solitude and unconfined recreation opportunities in wilderness. Although neither forest plan includes a comprehensive wilderness management plan, wilderness management direction can be found in various other Forest Service planning documents.

The Custer Gallatin includes major parts of two designated wilderness areas, the Absaroka-Beartooth Wilderness and the Lee Metcalf Wilderness. Both are located mostly on the Custer Gallatin, with a few areas managed by other neighboring forests or Federal agencies. The Lee Metcalf Wilderness consists of four separate geographic units located west and north of Yellowstone National Park, while the Absaroka-Beartooth Wilderness is a single unit located mostly north and northeast of the park. Together, these areas account for more than one-third of the national forest’s total acreage. They include about 840 miles of trails, mostly in the Absaroka-Beartooth Wilderness, but both have remote areas where people seldom go. More than 40 outfitters and guides operate under Custer Gallatin special use authorizations, using a few dozen designated camp areas. Motorized and mechanized recreation activities are prohibited, but there are nine grazing allotments with limited infrastructure, such as fences and water tanks, that are located partly in the wilderness areas.

Visits to the two designated wilderness areas on the Custer Gallatin more than doubled between 2008 and 2014.

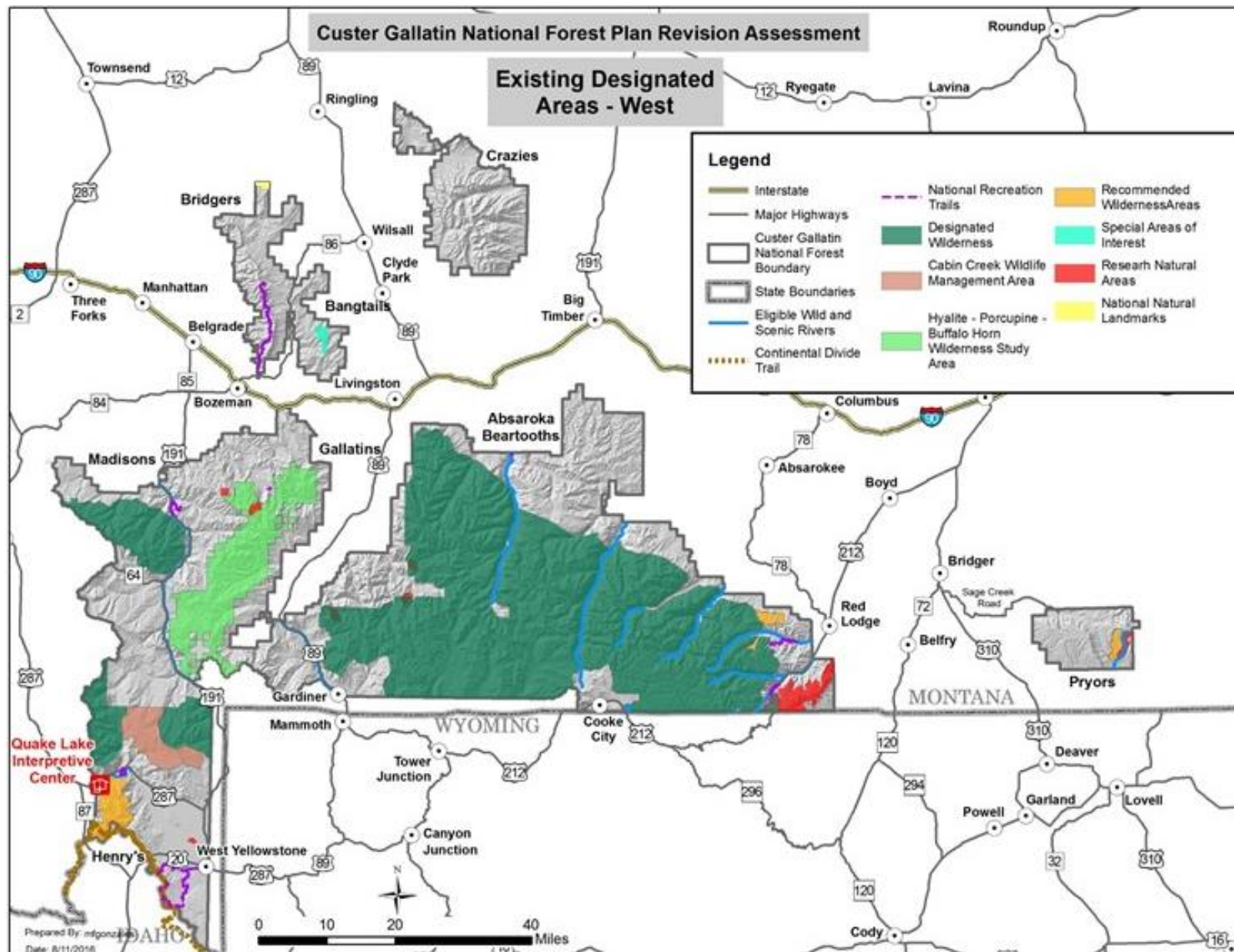


Figure 20. Existing designated areas on the west side of the Custer Gallatin National Forest

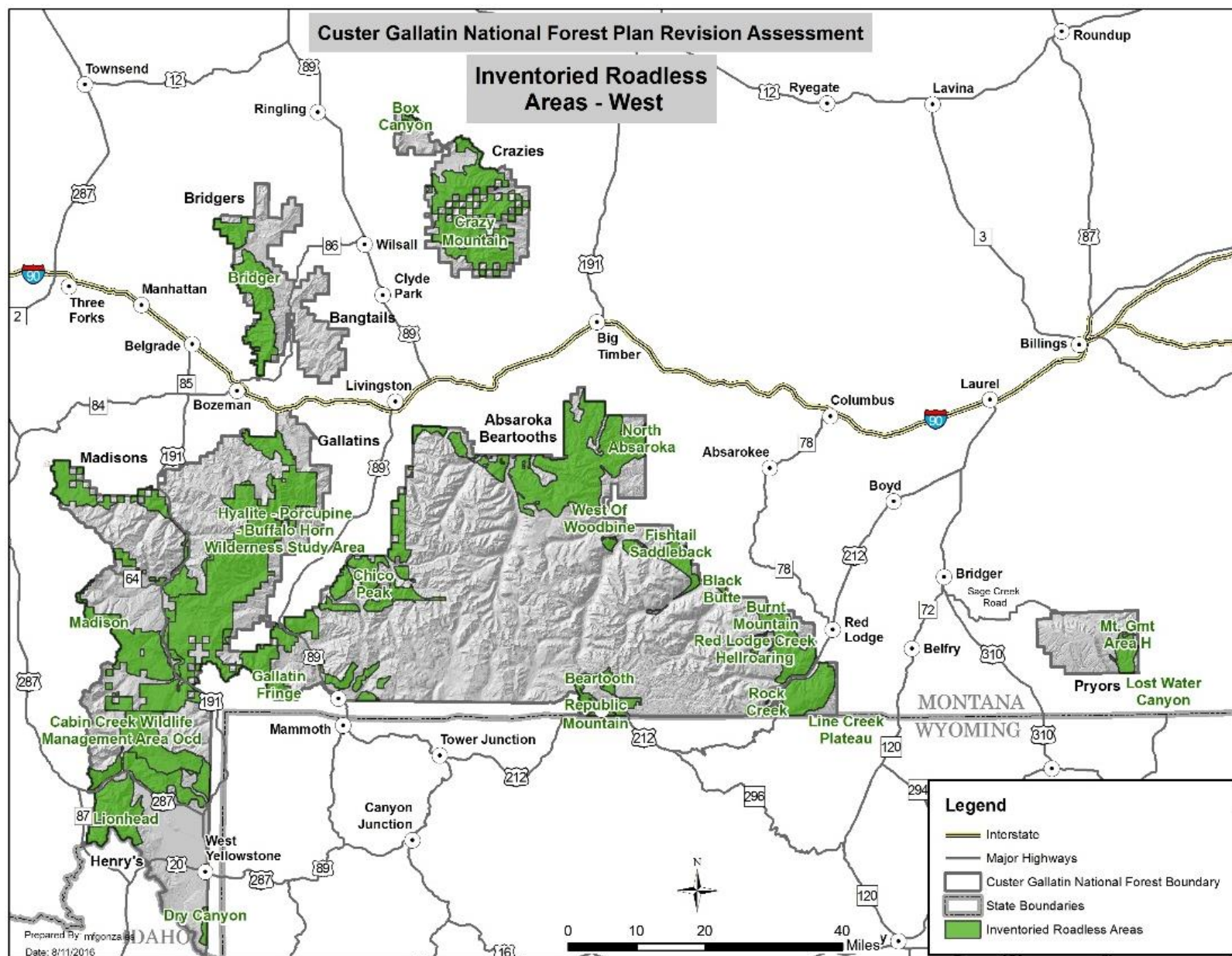


Figure 21. Inventoried roadless areas on the west side of the Custer Gallatin National Forest

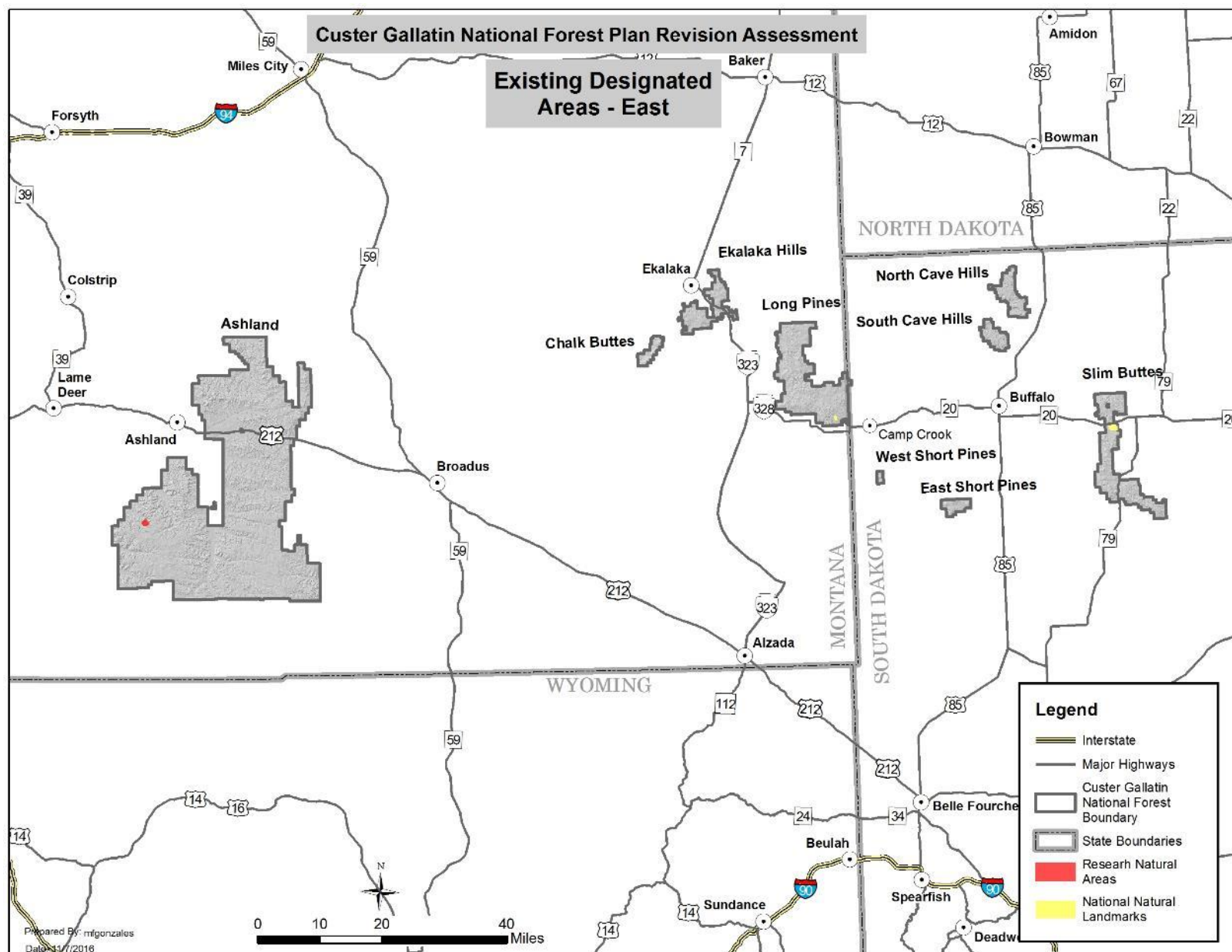


Figure 22. Existing designated areas on the east side of the Custer Gallatin National Forest

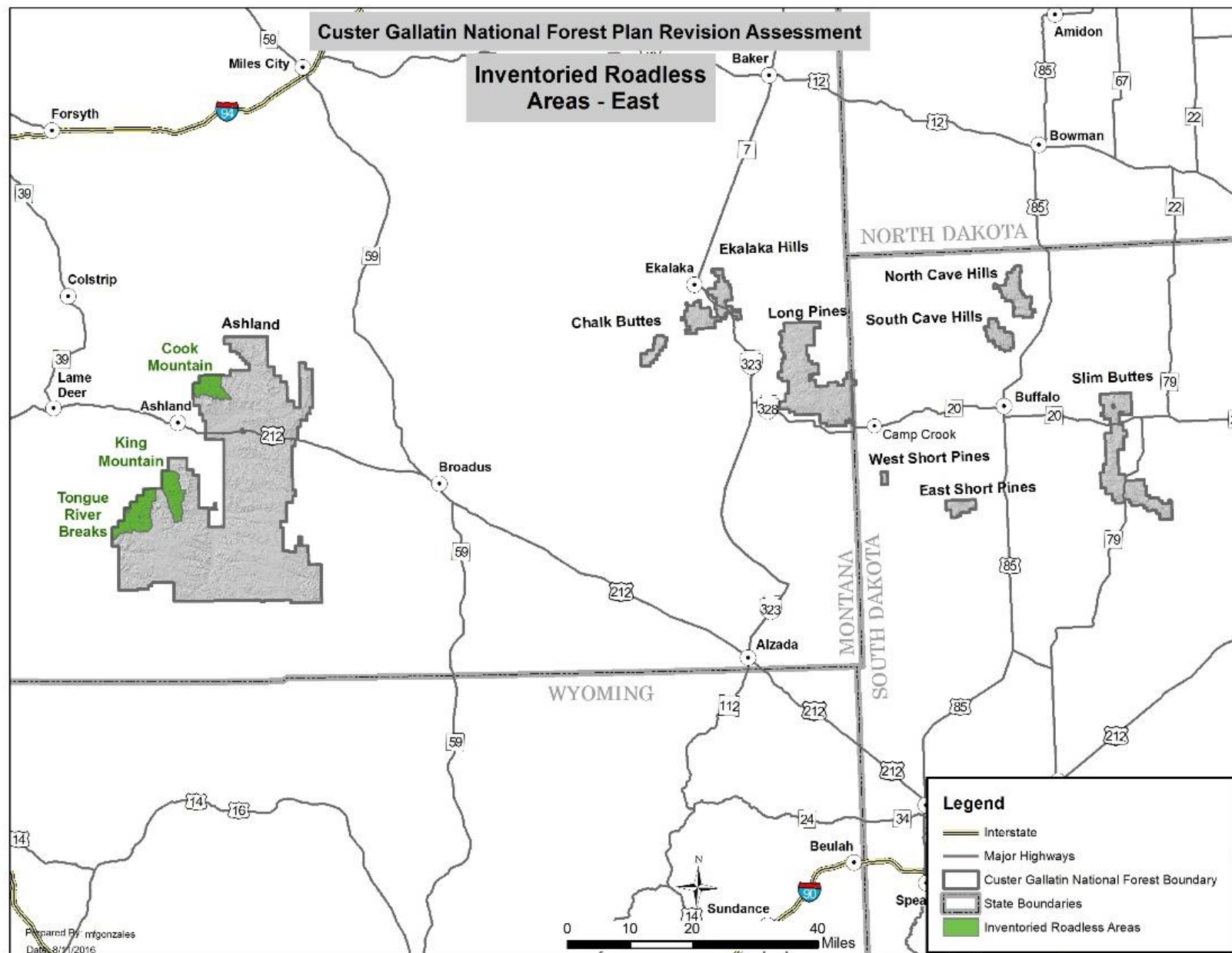


Figure 23. Inventoried roadless areas on the east side of the Custer Gallatin National Forest

To improve wilderness conditions in areas such as these, the Forest Service implemented a program called the “10-Year Wilderness Stewardship Challenge” that concluded in 2014. Areas of focus included invasive plants, air quality, solitude, unconfined recreation, data inventory, outfitter guide management, forest planning direction, workforce, the role of fire, and outreach and education. After the Challenge period was over, an interagency group including the Forest Service began a new initiative called the “2020 Vision” to guide wilderness area stewardship. As part of this initiative, Custer Gallatin wilderness managers will focus on invasive species, trails infrastructure, outfitter and guide operations, the role of fire, and opportunities for solitude. Management concerns related to these areas also include protection of plant and wildlife habitat and refugia (isolated locations for once-widespread species) and rising human use.

Inventoried Roadless Areas

Many Custer Gallatin designated areas, including recommended wilderness, are located in inventoried roadless areas. These areas are managed under the Forest Service’s 2001 Roadless Area Conservation Rule. As Table 5 shows, nearly 850,000 acres on the Custer Gallatin, or about 30 percent of the national forest’s total acreage, are in this category.

Table 5. Inventoried roadless area acreage by Custer Gallatin landscape areas

Landscape area	Acres
Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains	668,422
Bridger, Bangtail and Crazy Mountains	129,343
Pryor Mountains	10,421
Ashland District	39,234
Sioux District	0
Total	847,420

National Natural Landmarks

This category, which was established in 1962, identifies and recognizes the country’s best examples of ecological and geological features. There are three national natural landmarks located on the Custer Gallatin: Capital Rock and the Castles on the Sioux District and Middle Fork Canyon in the Bridger Mountains. Capital Rock and the Castles each features a unique geologic formation due to uplift and erosion within the surrounding prairie environment while Middle Fork Canyon features rocks that were deformed by tectonic movement. The Custer forest plan provides direction related to national natural landmark protection and recreation opportunities while the Gallatin forest plan does not provide any direction for this category.

National Scenic Byways

A national scenic byway is a road recognized by the U.S. Department of Transportation for one or more of six qualities: archeological, cultural, historic, natural, recreational and scenic. The most scenic of these byways, including some of the most scenic drives in the country, are designated as All-American Roads. This designation is important in terms public awareness and potential funding for infrastructure improvements. The Custer Gallatin includes parts of one such road: the 67-mile Beartooth Highway National Forest Scenic Byway and All-American Road, which is the section of U.S. Route 212 between Red Lodge

and Cooke City. The National Scenic Byways Program is administered by the Federal Highway Administration. Management for the 53-mile “All-American” section of the road follows the Beartooth All-American Road Corridor Management Plan, which was prepared in 2002 with input from Forest Service representatives.

With an elevation of more than 10,000 feet, the Beartooth Highway is the highest highway in Montana.

National Trails

National Historic Trails. These areas are designated to protect the remains of significant travel routes that reflect the history of the nation. The Custer Gallatin includes parts of one such trail: the Nez Perce National Historic Trail. Designated by Congress in 1986, the trail stretches nearly 1,200 miles from eastern Oregon to the plains of north-central Montana. Connecting 38 historical sites, the trail commemorates the route taken by a large band of the Nez Perce Tribe in 1877 as they attempted to elude the U.S. Cavalry (see map in “Cultural and Historical Resources and Uses” section). Management of this area is based on several laws and regulations, including the National Trails System Act of 1968.

National Recreation Trails. This is a designation given to existing trails that contribute to health, conservation and recreation goals. Most are hiking trails, but all potentially benefit from the prestige, visibility and potential funding that come from being a part of the National Trails System. There are 12 of these trails on the Custer Gallatin, all in the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area:

- Basin Lakes Trail
- Big Sky Snowmobile Trail
- Boulder River Natural Bridge Trail
- Bridger Foothills Trail
- Gallatin Riverside Trail
- Garnet Mountain Trail
- Palisade Falls Trail
- Parkside Trail
- Refuge Point Trail
- Silver Run Ski Trail
- Two Top Loop Snowmobile Trail
- Wild Bill Lake Trail

National Scenic Trails. This designation is for U.S. areas with trails of particular natural beauty. The Custer Gallatin includes about 28 miles of one such trail, the Continental Divide National Scenic Trail. Located on the Hebgen Ranger District, the trail is managed according to the National Trails Act, the Gallatin forest plan and other directives, including those in the 2009 Continental Divide National Scenic Trail Comprehensive Plan.

Pryor Mountain Wild Horse Territory

This Forest Service portion (referred to as a “territory”) of the Pryor Mountain Wild Horse Range was defined by the Wild and Free-Roaming Horses and Burros Act of 1971. This law made it a crime for anyone to harass or kill unbranded and unclaimed horses and burros on U.S. public lands. It also allowed public land to be set aside for wild horses and burros and required the Departments of the Interior and Agriculture to protect the animals. Under the law, the Bureau of Land Management (BLM) and the Forest Service manage herds where wild horses and burros were found roaming when the Act was passed. For the Pryor

Mountain herd, the Custer Gallatin and National Park Service cooperate with the BLM, which is the lead agency.

The Pryor Mountain Wild Horse Range is a refuge for a herd of free-roaming wild horses, with a target herd size of 90 to 120 horses, not including foals. The Range has an area of about 43,000 acres. The Custer forest plan directs the Forest Service to cooperate with the BLM on monitoring, habitat conservation and range improvements. Management issues related to this area include archaeological resources, areas of tribal significance, increased human visitation, wild horse population control, and the risk of severe wildfire in areas that have heavy fuel loads.

Recommended Wilderness

The Custer and Gallatin forest plans include almost 36,000 acres of “recommended wilderness.” This designation is a preliminary recommendation for review by the Chief of the Forest Service, the Secretary of Agriculture and both houses of Congress. The President of the United States has the final say. While none of these areas have been designated as wilderness, they are generally managed in a way that protects their condition for consideration as designated wilderness. Management issues for these locations are generally similar to those in designated wilderness areas. Recommended wilderness areas on the Custer Gallatin are listed below, along with their approximate size and general location.

- Burnt Mountain: 3,900 acres west of Red Lodge
- Line Creek Plateau: 800 acres west of Red Lodge
- Lionhead: 22,800 acres near West Yellowstone
- Lost Water Canyon: 6,800 acres in the Pryor Mountains
- Mystic: 250 acres near Mystic Lake
- Red Lodge Creek Hell Roaring: 800 acres west of Red Lodge
- Republic Mountain: 480 acres near Cooke City

Recreation and Wildlife Management Areas

These are protected areas set aside for wildlife conservation and recreation. On the Custer Gallatin, Congress established the Cabin Creek Recreation and Wildlife Management Area. Located next to the Lee Metcalf Wilderness, it encompasses Upper Wapiti Creek, Carrot Basin and Cabin Creek. It's entirely within occupied grizzly bear habitat and contains important big game habitat. The 2006 Gallatin Travel Plan decision allows broad use of the Cabin Creek area by several different types of recreational users, including the retrieval of animals killed during hunting season on motorbikes or snowmobiles.

Research Natural Areas and Special Interest Areas

Research natural areas. Usually located within national forests, research natural areas are places that a Federal agency has designated to be permanently protected and maintained in natural condition. They can include unique ecosystems or ecological features, areas with rare or sensitive species of plants and animals and their habitat, or high-quality examples of widespread ecosystems. Generally, livestock grazing, timber production, wildlife habitat improvements, range improvements, new trails and other activities are limited or prohibited. There are 10 research natural areas on the Custer Gallatin, listed below. All the research

natural areas are located in the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area except Lost Water Canyon (located in the Pryor Mountains landscape area) and Poker Jim (located in the Ashland District landscape area).

- Black Butte
- East Fork of Mill Creek
- Line Creek Plateau
- Lost Water Canyon
- Obsidian Sands
- Palace Butte
- Passage Creek
- Poker Jim
- Sliding Mountain
- Wheeler Ridge

Special interest areas. Created to protect or enhance unique or special resources, this category is broader than the research natural area category and allowable activities are generally less restricted. It can include plant, animal, geological, historical, paleontological or scenic resources. There are two special interest areas on the Custer Gallatin: the Bangtail Botanical and Paleontological Special Interest Area and the Black Sand Spring Botanical Special Interest Area. The Bangtail Special Interest Area is notable for its fossils and for its longtime use as a research site, which helps researchers evaluate environmental changes over time. Black Sand Spring Special Interest Area contributes to the ecological integrity around the South Fork of the Madison River. The management goal for Bangtail Special Interest Area is to protect unique botanical and paleontological values for study and public enjoyment, while the management goal for Black Sand Springs Special Interest Area is to protect unique botanical values for study and public enjoyment.

Although conditions vary by area, management concerns for both types of areas include invasive species, insects, disease, changing environmental conditions due to climate change, recreational use, and high amounts of combustible forest fuels.

The map on the next page displays nine research natural areas and two special interest areas (Poker Jim Research Natural Area is not shown).

Special Geologic Areas

While not a common designation, the Madison River Canyon Earthquake Area was classified as a special area under the authority of the Secretary of Agriculture in 1960. The area was designated to allow natural processes to continue while providing for safe public use and enjoyment. The Earthquake Lake Visitor Center, constructed in 1967, provides interpretation and education about the 1959 earthquake, related events and national forest resource management.

Wild and Scenic Rivers

This category was selected for U.S. rivers or river sections that have “outstandingly remarkable values” related to scenery, recreation, geology, fish and wildlife, historic or cultural significance, or other similar values. These areas are preserved in their free-flowing conditions, with various protections from development. Riverfront lands and flow-dependent values are also protected. There are three steps to obtaining this designation: eligibility, suitability and Congressional action. Rivers that have been through the first step are called eligible wild and scenic rivers.

There are currently no designated wild and scenic rivers on the national forest, but several river sections are eligible for consideration.

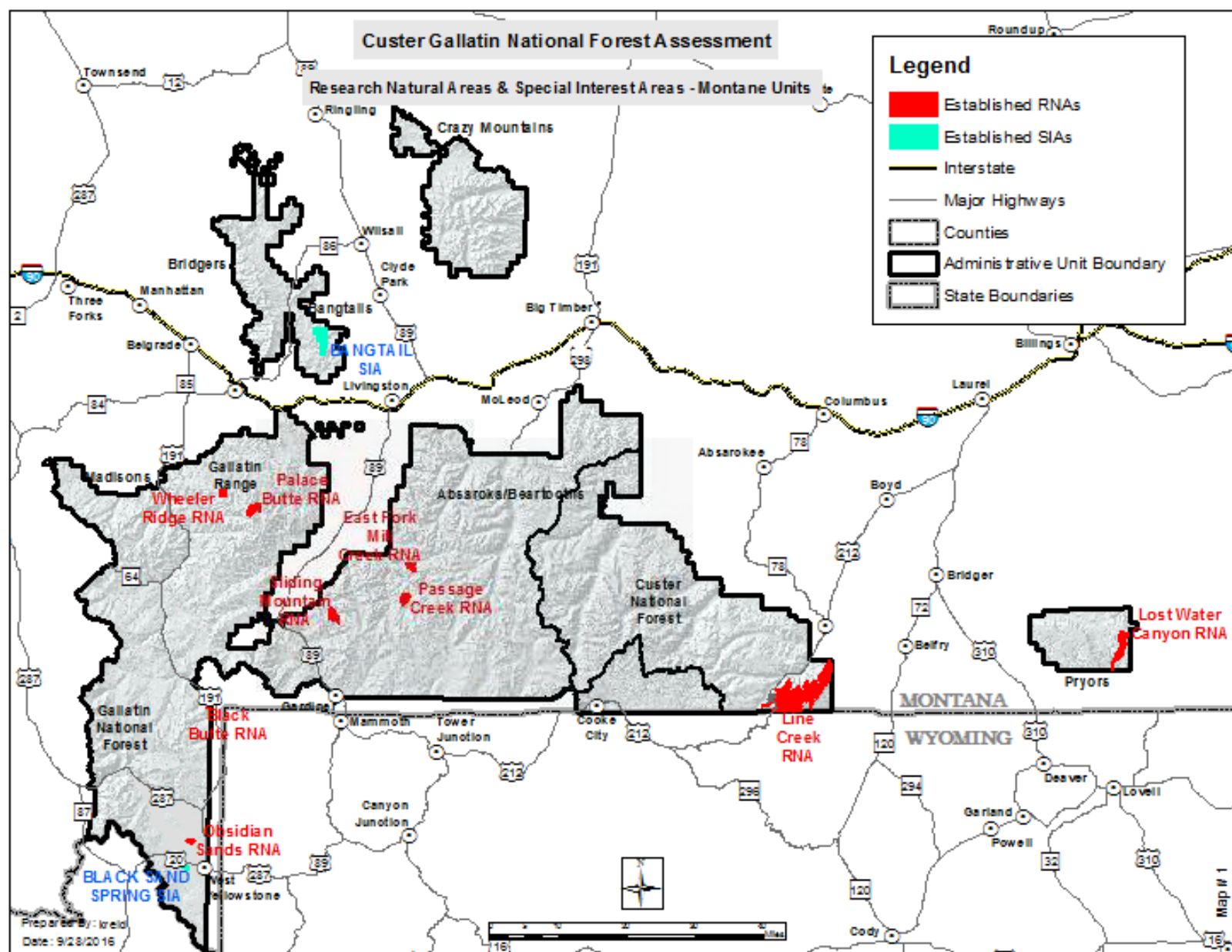


Figure 24. Research natural areas and special interest areas on the Custer Gallatin (the Poker Jim Research Natural Area, not shown on this map is located on the Ashland District)

There are currently no designated wild and scenic rivers on the national forest, but both forest plans identified several eligible wild and scenic rivers and provided management direction to protect their outstandingly remarkable values and their wild, scenic or recreational characteristics as defined by the Wild and Scenic Rivers Act. These river sections are listed below in Table 6. All are located in the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area except Crooked Creek, which is in the Pryor Mountains landscape area.

Table 6. Eligible wild and scenic rivers on the Custer Gallatin

River / Creek	Outstandingly Remarkable Values	Approximate Miles and Tentative Classification
Clarks Fork of Yellowstone River	scenic, recreation	2 for wild
Crooked Creek	cultural, fishing, geologic, scenic	8 for wild
East Rosebud Creek	geologic, recreation, scenic	13 for wild; 7 for recreation
Gallatin River	scenic, recreation, fishing	39 for recreation
Boulder River	geologic, recreation, scenic	19 for scenic; 9 for recreation
Lake Fork of Rock Creek	geologic, scenic	8 for wild; 2 for recreation
Madison River	geologic, scenic, fishing	9 for recreation
Rock Creek	geologic, recreation	13 for recreation; 3 for wild
Stillwater River	fishing, recreation, scenic	20 for wild; 7 for recreation
West Fork Rock Creek	fishing, geologic, recreation	10 for recreation; 10 for wild
West Rosebud Creek	geologic, recreation, scenic	8 for wild
Yellowstone River	scenic, recreation	17 for recreation

Wilderness Study Areas

Congress established wilderness study areas to allow selected areas to be reviewed for suitability for preservation and to direct land management agencies to manage the areas to retain their wilderness characteristics. They are managed in this way until Congress designates or “releases” them. A wider range of uses and activities are permitted in these areas compared to designated wilderness.

The 155,000-acre Hyalite Porcupine Buffalo Horn is the only wilderness study area on the Custer Gallatin. This area is important for several reasons, one being that it’s home to a wide range of vegetation and wildlife species. Another reason is that the city of Bozeman depends on watersheds in this area for much of its municipal water. Public uses include hiking, camping, hunting, fishing, mountain biking, ice climbing, horseback riding, cross-country skiing, snowmobiling, collecting specimens from the Gallatin Petrified Forest, and outfitter and guide services. Commercial mineral extraction, timber harvesting and road construction have largely ceased while permitted livestock grazing levels have been reduced. Today, invasive species, fire exclusion and new recreational uses are typical management concerns.

Much of Bozeman’s municipal water supply comes from watersheds in the Hyalite Porcupine Buffalo Horn Wilderness Study Area.

Although the Forest Service evaluated this area for wilderness designation in the early 1980s, it wasn’t recommended because of developed areas and more than 50,000 acres of

intermingled private land. Litigation over land use and management actions ended a few years ago. Since 2013, a community group called the Gallatin Community Collaborative strived to develop a long-term, consensus-based management proposal to the Forest Service. In 2016, the group submitted a final report outlining its processes and conclusions. The report did not make specific area management recommendations.

Recreation and Wildlife Management Areas

These are protected areas set aside for wildlife conservation and recreation. On the Custer Gallatin, Congress established the Cabin Creek Recreation and Wildlife Management Area. Located next to the Lee Metcalf Wilderness, this area encompasses Upper Wapiti Creek, Carrot Basin and Cabin Creek. It's entirely within occupied grizzly bear habitat and contains important big game habitat. The 2006 Gallatin travel plan decision allows broad use of the Cabin Creek area by several different types of recreational users, including the use of motorbikes and snowmobiles to retrieve animals killed during hunting season.

Looking Forward: Conclusions and Concerns

Land designations on the Custer Gallatin are a complicated topic, with different laws, regulations and agencies involved. Development of a new Custer Gallatin forest plan provides an opportunity to improve consistency and establish broad management goals and direction while recognizing that land uses, conditions and requirements may change over time.

Forest Service planning regulations require Custer Gallatin specialists to study potential recommended wilderness areas and eligible wild and scenic rivers. Other opportunities for collecting information include:

- updated inventory of opportunities for solitude and primitive recreation, using updated guidance, within designated wilderness;
- updated inventory of invasive species and fuel conditions in research natural areas and other designated areas;
- updated inventory conditions in the Poker Jim Research Natural Area to see if management actions can address concerns related to grazing and forest fuels; and
- updated trail condition survey information for designated trails.

Additional Information

Oswald, L. 2016. Assessment for Forest Plan Revision – Existing Designated Areas Report, Custer Gallatin National Forest.

Reid K. 2016. Assessment for Forest Plan Revision – Research Natural Areas and Special Interest Areas Report, Custer Gallatin National Forest.

Reid K. 2016. Assessment for Forest Plan Revision – Pryor Mountain Wild Horse Territory Report, Custer Gallatin National Forest.

These reports are available on the Custer Gallatin Forest Planning Web page at: www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

They can also be obtained by requesting a copy from the contact listed inside the cover page.

Scenery

*“Everybody needs beauty as well as bread, places to play in and pray in,
where nature may heal and give strength to body and soul.”*

- John Muir

Protecting a Magnificent Landscape

From the rugged mountains in the western regions to the pine savanna, buttes and bluffs in northwestern South Dakota, the Custer Gallatin’s scenery has incredible variety. A few examples are the majestic Absaroka Mountains as seen from Paradise Valley and the otherworldly Castles National Natural Landmark in northwestern South Dakota. The Custer Gallatin also has human-introduced elements that add to the scenic character, such as Civilian Conservation Corps projects or historic cabins and old mining features.

According to the agency’s 2012 Planning Rule, the Forest Service must consider “scenic character” (a sense of place based on an area’s visual attributes) and sustainability of recreation settings in planning decisions. In addition, the Forest Service must take into account how scenery contributes to local social and economic sustainability. In other words, the Forest Service must consider the value of scenery for people who are viewing national forest scenery from within a national forest, but also for people who are viewing a national forest from outside its boundaries. This can make management decisions much more complicated, but it serves as a reminder that national forests have an impact that far exceeds their administrative boundaries. Across its many landscape areas, the Custer Gallatin is part of local viewsheds—that is, they can be clearly seen from common viewing areas such as towns, highways and county roads.

***As private land bordering the Custer Gallatin
becomes more developed and populated, views
into the National Forest are becoming less natural.***

Protecting scenery becomes more complicated every year. One reason for this is that private homes being built next to national forest land are becoming part of viewsheds. This also increases the need for fuel reduction efforts that may change the national forest’s natural look. On the other hand, tree growth and restoration efforts are improving views over time by hiding old clearcut sites, mining areas and roads.

Taking A Fresh Look

During the many decades when the Custer and Gallatin were separate national forests, each took different approaches to evaluating and managing scenery. Many of those evaluations are now outdated because of changes to land use.

To help update scenery goals and management direction, Custer Gallatin specialists have evaluated areas based on factors such as variety, vividness, mystery, uniqueness, patterns and balance, all of which are compared to the areas’ wider ecological regions. Their “inherent scenic attractiveness” is then classified using one of the following three terms:

- **distinctive** (areas where landform, vegetation patterns, water characteristics and cultural features combine to provide unusual, unique or outstanding scenic quality),
- **typical/common** (areas where features combine to provide ordinary or common scenic quality), or
- **indistinctive** (areas where features have low scenic quality).

Table 7 shows Custer Gallatin scenic attractiveness levels as rated in 1980 and 2004.

Table 7. Inherent scenic attractiveness levels: preliminary percentages by area

Area	Distinctive	Typical/Common	Indistinctive
Henrys Lake and Madison Mountains, Gallatin River	28	53	19
Gallatin Mountains	23	59	18
Absaroka and Beartooth Mountains	57	40	3
Bridger and Bangtail Mountains	8	84	8
Crazy Mountains	30	51	19
Pryor Mountains	69	26	5
Ashland District	54	38	8
Sioux District	83	17	0

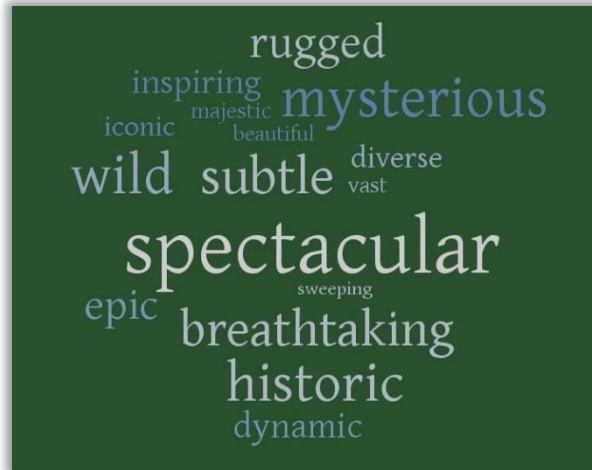
To evaluate “scenic integrity,” which is defined by the Forest Service as current visual conditions in relation to human-caused features (such as roads, mines, utility lines or timber harvesting), the Custer and Gallatin were evaluated from 2008 to 2010 using geographic information system processes. The results of this study were very generalized and have not yet been verified on the ground, but they may be useful in giving a general sense of initial findings. These results are summarized in Table 8.

Table 8. Scenic integrity: percentages by landscape area (2010)

Landscape Area	Very High or High	Moderate or Low
Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains	92	8
Bridger, Bangtail and Crazy Mountains	89	11
Pryor Mountains	93	7
Ashland District	95	5
Sioux District	85	15

Scenic Character by Landscape Area

Custer Gallatin specialists are conducting ongoing scenic assessments to comply with the 2012 Planning Rule and to help create scenic goals and objectives for each of the national forest’s five landscape areas. Brief descriptions of each area can be found below.



Gallatin River Corridor and the Madison and Henrys Lake Mountains

This part of the Custer Gallatin provides a scenic backdrop for West Yellowstone, Big Sky and the Gallatin Valley. Viewsheds can be seen from Highway 20 between West Yellowstone and Targhee Pass, along Highway 287 near Hebgen Lake, and downstream along the Madison River to Earthquake Lake. Viewsheds can also be seen along Highway 64, where the mountains' sharp ridges, cirques and avalanche gullies are a backdrop for multi-million-dollar houses. From Highway 191, between West Yellowstone and the Gallatin Valley, national forest land in the Madison Range dominates the viewshed to the west (and southwest as seen from the Gallatin Valley). Other elements that contribute to the area's scenic character include ski areas, snowmobile trails, national recreation and scenic trails, and the Covered Wagon Ranch.



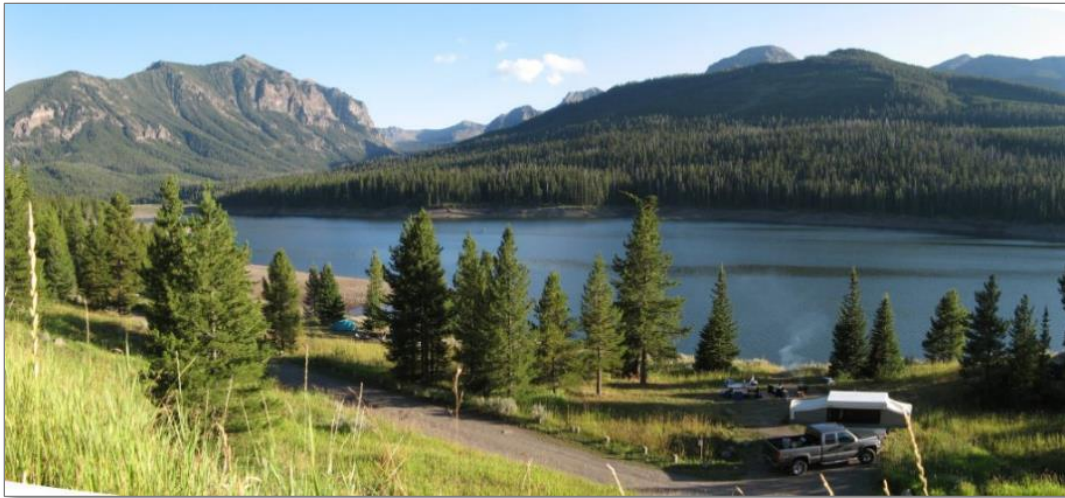
View of the Madison Range toward the Madison River Canyon from the Highway 287 corridor looking across Hebgen Lake to the west

Gallatin, Absaroka and Beartooth Mountains

Covering more than two-thirds of the Custer Gallatin, this landscape area includes high, rugged mountains and broad valleys. Much of the area has been scoured by glaciers, resulting in dramatic features and high scenic quality. Forests, sagebrush and tundra are home to a variety of animal species, including large wildlife such as elk, bear, moose, bison

(near West Yellowstone) and Rocky Mountain goats (at higher elevations, especially in the Beartooth Mountains). Historic cabins and ranches can be found throughout this area, along with historic structures built by the Civilian Conservation Corps between 1933 and 1942. Major subsections of this area are described below.

Gallatin Mountains. North of Yellowstone National Park, the Gallatin Mountains form the southern viewshed for the Gallatin Valley's rapidly growing population. The upper parts of the range have sharp volcanic cliffs, peaks, meadows, cirques and lakes. The Hyalite area, considered by many to be the jewel of the Gallatin Mountains, can be seen from the northern Gallatin Valley. Visible from sections of Highway 191 are steep slopes that drop, often via spectacular limestone or gneiss cliffs, into Gallatin Canyon. Other elements that contribute to the area's scenic character include parts of the Hyalite Porcupine Buffalo Horn Wilderness Study Area, several national recreation trails, historic cabins, Civilian Conservation Corps projects and sections of the historic Yankee Jim toll road.



Hyalite Reservoir, Hood Creek Campground and Sleeping Giant Mountain in the Gallatin Mountains (photo by Jane Ruchman)

Absaroka and Beartooth Mountains. These Mountains area covers a huge, diverse region in the viewshed of several communities and travel corridors. At its core is the sprawling and often rugged Absaroka-Beartooth Wilderness, including Granite Peak, which is Montana's highest mountain. Rocky Mountain goats can be seen on mountainsides. Scenic areas include the viewsheds from the famous Beartooth Scenic Byway, the Yellowstone River Valley and the Highway 89 corridor between Livingston and Gardiner, referred to as "Paradise Valley." The Interstate 90 corridor east of Livingston offers views of Elephant Head Mountain and other peaks. Highway 78, between Absarokee and Red Lodge, parallels the uplifted east face of the Beartooth, visible above privately owned rolling ranchlands. Other elements that contribute to the area's scenic character include numerous lakes, reservoirs and waterways, several national recreation trails, the OTO Ranch, Civilian Conservation Corps facilities, historic Forest Service structures, and features left by miners, early residents, homesteaders and herders.



Above: Beartooth Scenic Byway and Rock Creek drainage (photo by John Thompson);
inset: Absaroka Mountains south of Livingston

Bridger, Bangtail and Crazy Mountains

This landscape consists of rugged, high-elevation mountains and foothills with many forests and meadows. Black bears and mountain goats are fairly common along Bridger Ridge and in the Crazy Mountains. A variety of vegetation, abrupt elevation changes and past glacial activity contribute to the scenic value, along with historic cabins and minor ranching features. Major subsections of this area are described below.

Bridger and Bangtail Mountains. The approximately north-south trending Bridger Mountains dominate the Gallatin Valley's much-loved eastern viewshed. Particularly in spring, when the west-facing slopes are still covered with snow, the Bridgers form an impressive backdrop to the Bozeman and Belgrade areas. East-side views of the southern Bridgers include avalanche slopes, bare rock faces, Bridger Bowl Ski Area and the broken limestone dome of Ross Peak. From the Fairy Lake area, large rock fins and walls enhance the area's rugged feel. North of the Fairy Lake area, spectacularly uplifted and twisted multi-colored rock layers are visible from Highway 86.



The southwest side of the Bridger Mountains over Bozeman; the Bangtails are on the far right

Visitors to Bridger Bowl Ski Area and westbound travelers on Interstate 90 can look east to the Bangtail Mountains. Other elements that contribute to the area's scenic character include Battle Ridge Cabin, the Bridger Mountains National Recreation Trail and the Middlefork Canyon National Natural Landmark.

Crazy Mountains. The Crazy Mountains are a visually striking, isolated mountain range that abruptly rises more than 6,000 feet above the surrounding ranchlands and rolling, forested ground. These mountains, which hold spiritual significance to the Crow Nation, are visible from the Interstate 90 corridor near Big Timber as it parallels the Yellowstone River, the Highway 89 corridor on the west as it passes through the Shields River Valley, and Highway 191 on the east. The Crazies' jagged peaks and slopes have been scoured by glaciers, leaving knife-edge ridges, sweeping slopes, beautiful alpine lakes, and often-turbulent creeks and rivers. The Custer Gallatin section of the Crazies, in the southern two-thirds of the mountain range, is interspersed with many private sections of land, most of which are ranching land or have little to no development. Specific scenic elements include the area's historic cabins.



The east side of the Crazy Mountains

Pryor Mountains

Located 60 miles east of Red Lodge and 60 miles south of Billings, the Pryor Mountains are not within the foreground or middle-ground viewsheds of any major communities. They can, however, be seen in the distance from Highway 308 east of Red Lodge, Highway 310 south of Bridger, from a few places along the road into Bighorn Canyon National Recreation Area, and from Lovell, Wyoming and nearby communities. Views along gravel roads that approach the Pryors' western and southern slopes are across relatively open dry grass and sage lands and areas of bare mineral soil. These isolated, upsweeping mountains include sharp crests, rock outcrops, sloping meadows, fir-spruce and lodgepole forests, and sagebrush-covered areas. Wild horses can be found within the Pryor Mountain Wild Horse Range, which includes a small portion of national forest land. Because of the often rocky roads, most visitors are on all-terrain vehicles or on foot. Although the Pryors are not heavily visited, the most popular locations for visitors are Big Ice Cave and Dryhead Overlook. Higher elevations feature jagged cliffs, ridges and caves, while lower elevations have narrow, deep valleys and canyons along with flat, narrow plateaus and rust-colored rock formations. The sharp contrast between the heavily forested and exposed limestone cliffs create a high level of scenic variety. Other elements that contribute to the area's scenic character include historic cabins and remnants of ranching and mining operations.



Above: Bear Canyon on Big Pryor Mountain; inset: Commissary Ridge and Dryhead Overlook of East Pryor Mountain

Ashland District

Located in southeastern Montana, this landscape area includes seemingly endless prairies and plains that transition to flat-topped, steep-sided buttes, ponderosa pine savanna and often colorful badlands along wide valleys. Clustered tree stands and small creeks can also be found here. Scenic views can be found from Highway 212, Ashland Birney Road and Otter Creek Road. Other elements that contribute to the area's scenic character include the Cook Mountain Hiking and Riding Area, the King Mountain and Tongue River Breaks Hiking and Riding Area, Poker Jim Butte and lookout, Diamond Butte, fire lookouts, historic cabins, Civilian Conservation Corps projects and other features such as fence lines, culverts, stone walls and scattered stock ponds.



Whitetail Cabin in the Ashland District

Sioux District

The Sioux District is made up of eight separate land units that are often described as “islands of green in a sea of rolling prairie.” These units feature mesas, buttes, plateaus, hills, cliffs and badlands rising 300 to 500 feet above nearby wheat and hay fields, rolling prairie and pastures. Panoramic views abound, including dramatic limestone cliffs, streams, reservoirs and ponderosa pine stands mixed with aspen and ash trees. Highway 20, as it passes

through Reva Gap and by Reva Gap Campground, offers impressive views of limestone outcrops and The Castles National Natural Landmark, while Highway 323 provides views of sloping grassy meadows, cliff rims and ponderosa pines in the Ekalaka Hills unit. Gravel roads provide access to sweeping vistas and solitude. Other elements that contribute to the area's scenic character include historic cabins, Capitol Rock National Natural Landmark, and Civilian Conservation Corps projects such as Camp Needmore in the Ekalaka Hills unit.



Capitol Rock National Natural Landmark in the Sioux District's Long Pines Unit

Looking Forward: Conclusions and Concerns

Significant portions of the Custer Gallatin have high scenic value, not only from within the national forest but also from nearby towns, roads and other areas. This has implications for locals who have chosen the area for its visual qualities as well as for visitors who make the area a travel destination. Following decades of change since the Custer and Gallatin forest plans were created in the 1980s, a consistent and updated scenery management approach is needed. As locations and views are evaluated and classified using updated standards, this knowledge will help the Custer Gallatin management to more accurately consider scenic values in context with other resource management decisions.

Additional Information

Ruchman, J. 2016. Assessment for Forest Plan Revision – Scenery Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd482956.

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Recreation Settings, Opportunities and Access

*"So get out there and hunt and fish and mess around with your friends,
ramble out yonder and explore the forests, climb the mountains,
bag the peaks, run the rivers, breathe deep of that yet sweet and lucid air,
sit quietly for a while and contemplate the precious stillness,
the lovely, mysterious and awesome space."*

- Edward Abbey

A Wonderland for Outdoor Enthusiasts

With more than 30 million acres of State and Federal lands, Montana has been called an outdoor recreation paradise. Recreational opportunities include hiking and hunting, camping and climbing, skiing and snowmobiling, fishing and floating. And if recreation is defined as "something done for enjoyment when one is not working," then we can't forget about rest and relaxation.

The Custer Gallatin is no exception. Recent Forest Service surveys found that nearly 85 percent of Custer Gallatin visitors came for recreation, especially hiking, biking, hunting, general relaxing, sightseeing, fishing, skiing and snowmobiling. The national forest also includes several recreational activities that are relatively overlooked, such as gold panning, visiting a petrified forest or spending a few nights at a remote, historic cabin. Here's a partial list of recreational resources and activities that can be found on the Custer Gallatin:



Ice climbing is one of many winter recreation activities on the Custer Gallatin

- all-terrain vehicle, motorcycle and off-highway vehicle trails
- boating, floating and kayaking areas
- cabin and fire lookout rentals
- cross-country ski trails and areas
- day use areas
- campsites and campgrounds
- downhill ski areas
- fishing
- hiking and backpacking
- horseback riding
- hunting
- visitor centers and interpretive sites
- mineral collection (including gold panning and petrified wood)
- mountain biking
- picnicking areas
- recreational driving
- recreational target shooting
- resorts
- rock and ice climbing
- scenery and wildlife viewing and photography
- snowmobiling trails
- snowshoeing
- wildlife viewing areas

These activities are an important part of the Custer Gallatin's relevance to humanity. They enrich life, provide a framework for memories, enable personal growth, and strengthen a sense of connection with other people and with nature. For residents in nearby communities, recreational activities on the Custer Gallatin have a major contribution to the local economy and the regional way of life. Yet recreational uses need to be weighed against sustainability and environmental concerns, including the need to protect habitat for grizzly bears, bald eagles and cutthroat trout.

It's a Popular Place ... and It's Getting Busier

Compared to other national forests in the central Rocky Mountains, the Custer Gallatin gets a lot of use. As Table 9 shows, the Custer Gallatin has annual visitation numbers that are comparable to several national parks in the region. In addition, the national forest gets a lot of use, partly due to its size, variety of terrain and its locations—a large part of the Custer Gallatin is near Yellowstone National Park and some of Montana's fastest-growing and most populous areas. Several areas near the western side of the Custer Gallatin are becoming more populated, and a recent study found that 60 percent of Custer Gallatin visitors travelled less than 25 miles to visit the national forest. This helps explain why, compared to a study done in 2008-2009, Custer Gallatin annual visitation in 2013-2014 was up nearly 40 percent.

Table 9. Regional national parks and national forests by size and annual number of visitors

Unit Name	Square Miles	Annual Visitation*
Yellowstone National Park	3,468	4,097,710
Grand Teton National Park	485	3,149,921
Custer Gallatin National Forest	7,642	3,035,000
Glacier National Park	1,583	2,366,056
Caribou-Targhee National Forest	6,587	1,852,000
Bridger-Teton National Forest	8,556	1,623,000
Lolo National Forest	5,628	1,266,000
Flathead National Forest	6,069	885,000
Helena-Lewis & Clark National Forest	7,176	591,000
Beaverhead-Deerlodge National Forest	8,456	583,000

* National Park figures are from 2015; National Forest figures are approximations based on 2010-2014 estimates.

***The Custer Gallatin National Forest
has annual visitation numbers that
rival several nearby national parks.***

A Closer Look at Recreation Opportunities

With its multiple river valleys and mountain ranges, the former Gallatin National Forest provides world-class outdoor recreation opportunities, while the jagged peaks, striking buttes and wide pine savannas of the former Custer National Forest offer expansive views and quality habitat for wildlife viewing and hunting. Yet both areas have much more to offer. Following is a partial list of Custer Gallatin recreation resources by type.

Camping and Picnicking Areas

The 63 developed campgrounds and picnic areas on the Custer Gallatin are operated and maintained directly by the Forest Service or by concessionaires. Most are located in forested areas near lakes or rivers. All are relatively rustic, although some have pressurized water systems or hand pumps. Some have electrical hookups, interpretive trails and safety features such as bear-resistant food storage containers. Forty-nine of these areas are in the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area, with the rest spread across the Custer Gallatin's other four landscape areas. The national forest also has recorded more than 2,700 wilderness and "dispersed" (undeveloped) camping sites, more than 2,500 of which are in the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area.

Interpretive and Educational Sites

The Custer Gallatin has several interpretive and educational sites, which are frequently unique places where natural or cultural resources are displayed. One such site is the Earthquake Lake Visitor Center. Located 27 miles northwest of West Yellowstone, this visitor center provides information on earthquakes—specifically the 1959 Hebgen Lake Earthquake, which triggered a massive landslide, blocked the Madison River and formed Earthquake Lake. In 2015, more than 40,000 people visited this complex, which opened in 1969 and features exhibits, films, presentations and interpretive trails.



Exterior display at Earthquake Lake and Visitor Center

Organizational Camps

Seven organizational camps operate in the Custer Gallatin: three in the Beartooth District, two in the Yellowstone District and one each in the Bozeman and Sioux Districts. These camps operate under the authority of the National Forest Organizational Camp Fee Improvement Act of 2003, which authorizes the use of national forest land for organizational

camp, such as those administered by the Boy Scouts, Girl Scouts and faith- and community-based organizations.

Outfitter and Guide Services

Approximately 175 outfitter and guide permittees operate on the Custer Gallatin. Following is a partial list of the services they offer, listed in order of approximate number of authorized days for each service in 2015, from highest to lowest.

- horseback trail rides
- boating and rafting
- snowmobiling
- environmental and adventure education
- rock climbing
- hunting
- fishing
- hiking
- backpacking
- skiing
- ice climbing
- mountaineering
- shuttles and livery services
- dog sledding
- yurts and camping
- biking
- snowshoeing
- wagon rides

Recreation Rental Cabins and Fire Lookouts

Mostly located on the west side of the Custer Gallatin are 25 cabins and two lookouts available to rent. Most were built in the 1920s and 1930s for use by forest rangers. These cabins have varying levels of modern amenities such as electricity or plumbing, and some are inaccessible by road. Twenty-one of these rentals are located in the Madison, Henrys Lake, Gallatin, Absaroka and Beartooth Mountains landscape area, with the rest in the Bridger, Bangtail and Crazy Mountains landscape area and the Ashland District. Average occupancy was 57 percent in 2015.

Ski Areas and Resorts

Two alpine ski areas and two Nordic ski areas are located at least partly on national forest land under site-specific special use permits: Red Lodge Mountain, Bridger Bowl Ski Area, Bohart Ranch Cross Country Ski Center and Lone Mountain Ranch.

Recreation Resorts

There are three commercial, privately owned recreation resorts on the Custer Gallatin, all on the Hebgen Ranger District in West Yellowstone: Campfire Lodge Resort, Covered Wagon Ranch and Madison Arm Resort. All three operate under 20-year special use permits.

Roads

Driving for pleasure has long been a popular activity on the Custer Gallatin. More than 1,400 miles of the national forest road system is open to public travel by passenger cars and trucks. Some roads, such as the Beartooth Highway Scenic Byway-All American Road, are destinations in and of themselves. Many of these roads are closed seasonally to protect wildlife, minimize erosion and prevent damage. With limited plow service, many areas become less accessible in winter while others with good access become destinations.

Trails

Hiking and walking are the top recreational uses of the Custer Gallatin, according to recent Forest Service studies. In these studies, 40 percent of Custer Gallatin visitors indicated that hiking and walking was their primary activity. This percentage is high relative to other public lands in Montana and the Greater Yellowstone Area.

Hiking and walking are the top recreational uses of the Custer Gallatin.

The national forest has thousands of miles of motorized and nonmotorized summer trails and hundreds of miles of groomed or marked winter snowmobile and ski trails. There are designated national recreation trails and the Continental Divide National Scenic Trail. The Cooke City and West Yellowstone areas are noted snowmobiling destinations, with Cooke City known for big mountain, backcountry and remote riding and West Yellowstone known for groomed trails and access to backcountry riding. There's also the Rendezvous Ski Trail system, a public Nordic ski center outside of West Yellowstone that has more than 18 miles of professionally groomed cross-country ski trails.

Trail access is serviced by nearly 175 trailheads that range from primitive to highly developed. Trail access links can be found in other national forests, Yellowstone National Park, numerous private properties and many other areas.



Custer Gallatin trails support a wide variety of uses (photo courtesy of Terry Jones)

Infrastructure Conditions

Recreational infrastructure on the Custer Gallatin is both extensive and expensive. It includes trails, roads and parking areas, trailhead bulletin boards and information, toilets, tables, fire rings, water systems, interpretive signs and fee stations. Much of this

infrastructure was designed and constructed in the 1970s and 1980s. While some sites have received capital improvements since then, many others have not. Since 2010, the Custer Gallatin recreation, heritage and wilderness budget has fallen 15 percent, the trails budget is down 9 percent and the facilities budget has been cut by 28 percent. In the meantime, the Custer Gallatin has been unable to increase user fees since the early 2000s. Reduced budgets and rising maintenance costs have led to a gradual overall decline in services and facility conditions, despite assistance from partners, interns and volunteers.

Since 2010, the Custer Gallatin's recreation, heritage and wilderness budget has fallen 15 percent.

Looking Forward: Conclusions and Concerns

With its combination of road access, backcountry, and developed and undeveloped areas, the Custer Gallatin features exceptional recreational opportunities, with a high local value from both social and economic perspectives. However, national forest use is rising faster than expected and recreational demands are becoming more varied and intense due to population growth and social changes. Management is also challenged as communities expand closer to the national forest. In the meantime, funding has fallen, reducing the ability to properly manage recreational resources as they currently exist, let alone if they change or if new recreational demands arise. And, of course, recreational demands must be balanced with other resource obligations, such as fish, water and wildlife. Even with an increased reliance on partners and volunteers, the recreation opportunities offered on the Custer Gallatin may change as competing priorities emerge for limited natural and financial resources.

To help with these decisions, national forest managers have several new resources, including a standardized protocol for classifying and monitoring resource conditions associated with dispersed uses such as climbing, recreational shooting and camping in general forest areas. Ongoing assessment projects, along with database and location updates for national forest resources, outfitters, and guides are among the opportunities that will help Custer Gallatin managers to better understand recreational use on the national forest and make better informed management decisions.

Additional Information

Oswald, L. 2016. Assessment for Forest Plan Revision – Recreation Settings, Opportunities and Access Report, Custer Gallatin National Forest.
www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd482956.

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Other resources for this section include:

USDA Forest Service 2008, 2009, 2013, 2014. National Visitor Use Monitoring Program National Reports. www.fs.fed.us/recreation/programs/nvum.

Infrastructure

*"America's highways, roads, bridges,
are an indispensable part of our lives...
We use them each and every day, for every conceivable purpose."
- Christopher Dodd*

The Importance of Infrastructure

Infrastructure is an essential aspect that enables much of the national forest's recreation and commercial use. Infrastructure provides transportation of people, goods and services. It includes residences and offices for management of the national forest. It enables recreational opportunities, provides for water and sanitation, and helps make a visit to the national forest a quality experience. Maintaining the national forest's infrastructure is also important to local economies and quality of life for people living in nearby communities.

For Custer Gallatin planning purposes, infrastructure is defined as the human-built property that has been created to support the management and use of the land. The infrastructure categories covered in this section include National Forest System roads, trails, bridges, dams, administrative facilities and recreation facilities, including water and wastewater systems.



Backcountry roads in the Benbow area allow access to scenic areas for visitors with high-clearance vehicles

Current Forest Plan Direction

The Custer and Gallatin forest plans both describe forestwide and management area-specific goals, objectives and standards related to facilities. Since those plans were written, there have been amendments and changes, particularly related to travel management around the various landscape areas of the national forest. Overall, these forest plans, travel management plans and facility master plans were created to be consistent with management

rules in the Forest Service Manual, the Forest Service Handbook and other Federal land and transportation management guidelines.

Existing Conditions

The number of visitors to the Custer Gallatin has risen in recent years, as has demand for various uses, including recreational and commercial uses. But while demand and usage has risen, budgets have not kept pace. As a result, it has become increasingly difficult to sustain the national forest's infrastructure in a condition that adequately provides for and protects visitors and natural resources.

Following are descriptions of several infrastructure types on the Custer Gallatin, listed alphabetically.

Airfields

There is one landing strip in the planning area, at the West Yellowstone smokejumper base. The Forest Service is evaluating the base's viability and whether it should be moved.

Dams

The Forest Service's infrastructure database identifies 10 dams on the Custer Gallatin, six of which are owned by the Forest Service. These dams, which vary in use from recreation to irrigation to hydroelectric energy generation, are maintained, operated and inspected by the Forest Service, State agencies or private contractors. There is no specific funding set aside for maintenance of dams; instead, maintenance is completed as part of normal operations and with project-specific funding. Current management plans for these dams are to maintain them in working condition and to inspect them regularly.

Fire, Administrative and Other Buildings

As of January 2015 there were 199 fire, administrative and other buildings on the Custer Gallatin, including fire stations, offices, warehouses, shops and residences. Living quarters are partly supported by rental payments while administrative facilities and other facilities are supported through annual budget appropriations. Because of limited budgets, there is a great amount of deferred maintenance associated with these buildings. Custer Gallatin managers are working aggressively to reduce deferred maintenance, including working with partners to find funding.

Because of limited budgets, there is a great amount of deferred maintenance associated with fire, administrative and other buildings.

Recreation Facilities

There are 427 buildings and structures that are classified as recreation facilities across the Custer Gallatin planning area. These facilities include buildings, lookouts, cabins, picnic shelters, toilets, and associated water systems and wastewater systems. Also included in this budget category are associated features such as signs, parking barriers and picnic tables.

Recreation facility maintenance is funded from a variety of sources. Traditionally, recreation facility maintenance is funded by facilities construction and maintenance appropriated funds. These funding sources have fallen over the past several years. As a result, deferred maintenance on Custer Gallatin recreation facilities exceeds the funding available. As recreational use increases within the plan area, Custer Gallatin managers seek to keep recreational facilities in operating condition and eliminate structures that are determined to be unnecessary or that can no longer be maintained.

Roads

National Forest System roads are those roads that the Forest Service has determined are necessary for the protection, administration, enjoyment and use of national forest land and resources. These roads are under the jurisdiction of the Forest Service and are mostly located on national forest land or on adjacent land under easement agreements. They range from rough, single-lane dirt tracks to paved, double-lane highways. These roads are a part of an overall transportation system that is managed with Federal, State, county and municipal agencies, with the goal of providing a seamless road network for many uses. Maintenance levels vary widely based on budgets, traffic levels, conditions and other factors.

Every road in the Custer Gallatin planning area has been inventoried, analyzed and classified for use levels, such as public or private and motorized or nonmotorized. Within the planning area, there are about 1,442 miles of roads that are open for public use either seasonally or year-round and about 1,445 miles of roads that are used mainly for administrative purposes and are generally closed to public motorized use. These numbers do not include user-created driving routes or roads that were closed and restored because they were redundant or damaging resources such as soil and water.

On a national level, road maintenance dollars are allocated to each national forest based on its “roaded” land area and recreation visitor use. During the past two decades, appropriated funding for road construction and maintenance has decreased. Meanwhile, usage and wear have increased while expenses have risen to improve safety protect resources and complete agency planning requirements. Funding for repairs and maintenance is expected to continue to decrease while national requirements and efforts for planning and maintenance continue to increase. Additional maintenance can be accomplished using other funding such as watershed improvement budgets, partnerships and special project work.

Appropriated funding for road construction and maintenance has decreased while usage, wear and expenses have increased.

Road Bridges

There are about 85 road bridges on the Custer Gallatin. Of these bridges, which are inspected every two years, eight are classified as being in an “intolerable” or “minimally tolerable” condition. Most of the 85 road bridges and all eight high-priority bridge projects are located on the Beartooth, Yellowstone and Bozeman Ranger Districts. The Custer Gallatin has an active bridge replacement program that replaces undersized culverts and bridges with new structures that allow aquatic species to pass through more easily. In many instances, culverts will be replaced by bridges, which will increase the total number of bridges—and long-term maintenance costs—on the national forest.

Trails

Trails are constructed, maintained and managed for a variety of recreational and administrative uses and are guided by travel management plans. As on most national forests, appropriated trail funds are not enough to provide for full operation and maintenance of the trail system. Partnerships, volunteers, grants and other sources have partly offset the lack of funds.

Trail Bridges

There are about 80 trail bridges in the Custer Gallatin planning area, mostly on the Bozeman, Beartooth and Yellowstone Ranger Districts. These bridges and associated structures, which are inspected on a five-year cycle, are in various conditions. Maintenance funding typically comes from the trails budget but can come from many other sources.

Looking Forward: Conclusions and Concerns

Public use of the Custer Gallatin is increasing, as is the population of Montana, especially in the Billings and Bozeman areas. There is a greater demand for Custer Gallatin services and land uses as well as increasing wear and tear on roads, buildings and other infrastructure. This trend is expected to continue. The inability to adequately maintain existing infrastructure could result in reduced access, recreation services and public use. Given these circumstances, the creation of a new forest plan offers the opportunity to define a realistic and sustainable desired infrastructure.

The following information resources would be useful for forest managers:

- traffic volumes to help determine average daily traffic and to show use patterns
- deferred maintenance cost analysis to show funding trends and road maintenance needs
- improved Custer Gallatin infrastructure location data
- an inventory of user-created roads
- improved information on Custer Gallatin dams

Additional Information

Shimek, D. and J. Kempff 2016. Assessment for Forest Plan Revision – Infrastructure Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

This report can also be obtained by requesting a copy from the contact listed inside the cover page.

Land Status and Ownership, Use and Access Patterns

*"As I was walking that ribbon of highway
I saw above me that endless skyway
I saw below me that golden valley
This land was made for you and me."
- Woody Guthrie*

Balancing Many Demands

Land status and ownership on the Custer Gallatin is a complicated topic. National forest managers must balance conservation goals, public access, private land development, recreational use, community growth, special uses of national forest lands and other issues to determine the best use of public land, while considering rights and requests related to the land in and around the national forest.

Land Status and Ownership

The Custer Gallatin forest plan area consists of more than 3 million acres of National Forest System lands and more than 384,000 acres of non-Federal lands within the national forest boundary that must be considered in management decisions because of their location. These lands include private, State-managed and tribal properties, some of which were designated before the National Forest System was created. Most of the private lands within the plan area originated as Federal land grants to the railroad companies, homestead patents and patented mining claims, mainly between the 1860s and 1920s. Some of the non-Federal lands, notably in the Big Sky area, the Bangtail Mountains area and the Sioux Ranger District in South Dakota, were established as a result of land exchanges, mainly from the 1950s to the 1990s.

Of the Custer Gallatin-managed lands, nearly 200,000 acres were acquired and placed under Forest Service management through land purchases, land exchanges, land donations, and conservation easements. In some instances, the acquired lands may involve rights (such as road access rights) that were reserved by the prior owner, and the acquired lands may also involve "outstanding rights" that are held by another party, such as mineral interests or a utility easement.

While land ownership relates to the name on the deed, land status refers to a combination of ownership and land use rights.

There are also many easements and rights-of-way that are not federally managed. This is where the concept of "land status" comes in. While land ownership relates to the name on the deed, land status refers to a combination of ownership and land use rights. Land status records are kept by the Forest Service, in both digital and printed formats.

Land Adjustment and Access Programs

Under land adjustment programs, the Forest Service acquires and consolidates key tracts of private land to conserve valuable natural habitat, reduce the risk of permanent development in sensitive areas, and enhance public recreational opportunities. Under land adjustment programs, the Forest Service also secures permanent road and trail rights-of-way (easements) to assure the protection, administration and use of National Forest System lands and resources.

One longtime area of concern is public access. While the Custer Gallatin has made significant gains in this area since the last planning effort in the 1980s, there are a few locations where access can be improved. For many years, the Forest Service has used land adjustment programs to address this issue.

While significant gains have been made in improving public access, there are a few locations where access can be improved.

The Custer and Gallatin forest plans both contain guidance for land adjustment and public access programs. The Custer plan identified a goal of providing for public access while the Gallatin travel management plan identified 46 locations with inadequate public access, involving about 21 percent of the Gallatin National Forest land base. In addition, Custer and Gallatin managers have made decisions about travel management in the last 10 years. These decisions have had the goal of identifying and establishing opportunities for public recreation use and access using the Forest's road and trail system.

While Federal funding and staffing to complete land adjustments and to secure and protect public access routes has declined in recent years, several groups have contributed time, money and legal expertise to help facilitate strategic land purchases and exchanges on the Custer Gallatin. These organizations include many local and national land conservation trusts and foundations.

Changes Since the 1980s

As a result of the land adjustment program, land ownership in the plan area has changed and, in places, improved considerably since the last planning effort. Public land ownership and access has been improved through about 25 land purchases and exchanges, mainly in the Gallatin, Madison, Absaroka, Bridger, Bangtail and Crazy Mountain areas. In the past 30 years, land exchanges have enabled the acquisition and consolidation of approximately 100,000 acres of former private lands within the Custer Gallatin in exchange for about 33,000 acres of National Forest System lands and about \$4 million in natural resource development rights. Overall, more than 168,000 acres have been added to the Custer Gallatin since 1986, while less than 36,000 National Forest System acres have been conveyed to private ownership. Lists of significant land purchases and exchanges can be found in the specialist report cited at the end of this section.

Potential Focus Areas

Despite successful land acquisitions and improved access, there remain hundreds of cases where access across private land is not secure because there are no recorded easements on existing trails and roads. National forest access is becoming even more complicated because of recent population growth, development and property subdivisions, especially on the western end of the national forest. Among the Montana and South Dakota counties that include Federal land managed by the Custer Gallatin, residential acreage increased an average 89 percent between the years 2000 and 2010.

As the maps on the next pages show, there are still intermingled ownership patterns in several areas: the east side of the Gallatin Range, the Bridger, Bangtail and Crazy Mountains, the north side of Spanish Peaks, the Cinnabar Basin, the Tom Miner and Mol Heron areas, and near Jardine, Cooke City and Hebgen Lake. There are also some inholdings (privately owned land inside the national forest boundary) in the Absaroka-Beartooth Wilderness and opportunities to work with private landowners to improve landownership patterns on the Sioux and Ashland Districts.

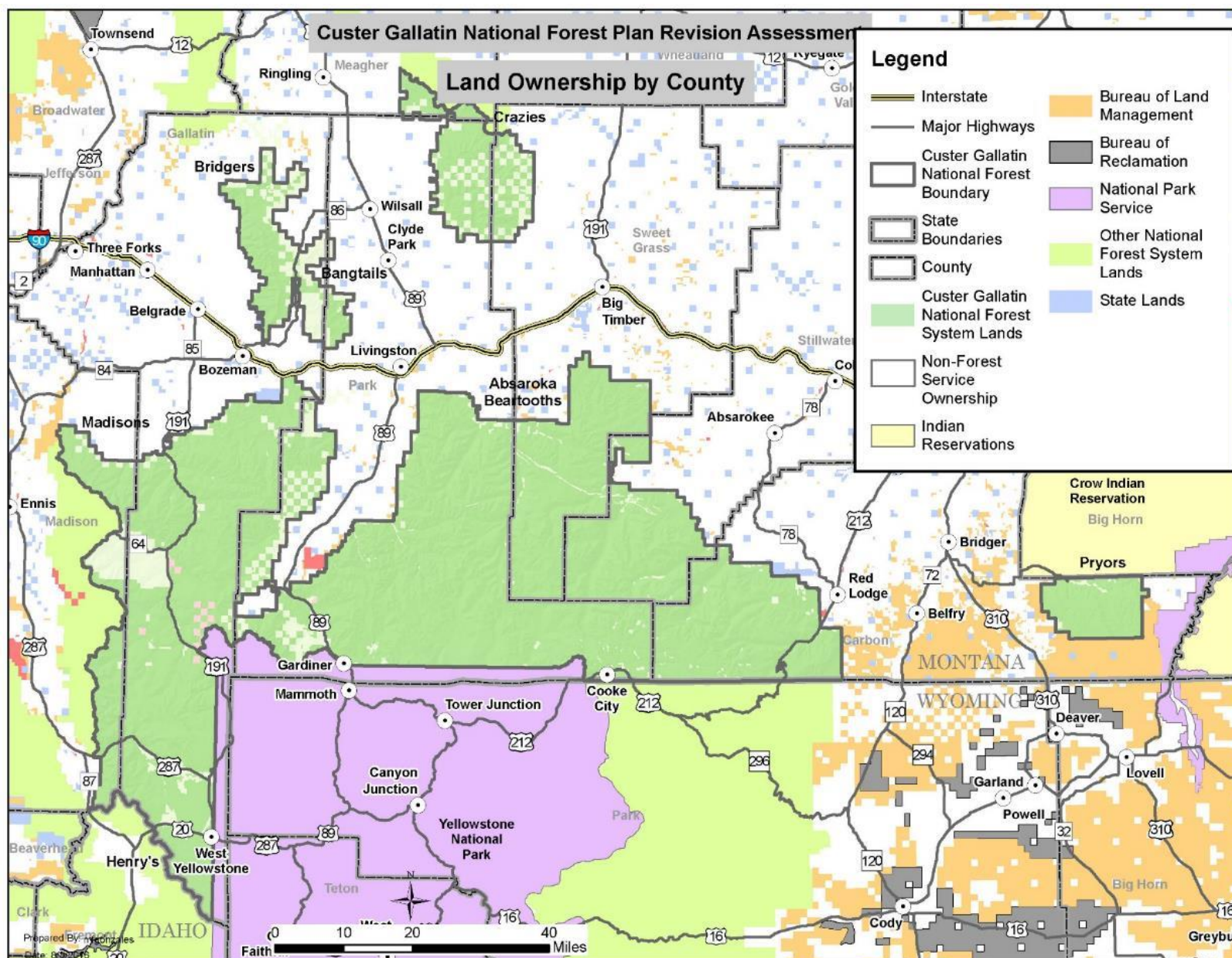
Special Uses

In the meantime, there is continued demand for special uses within Custer Gallatin boundaries, especially where public and private land meet. While special uses allow all kinds of recreation activities, utilities and natural resource development, special use authorizations need to be considered carefully, as they often limit future land management options. Proposals for new special uses are carefully screened to determine if the proposed use is in the public interest or if the use can be located on non-Federal lands.

The Custer Gallatin currently administers more than 800 special use authorizations.

There are more than 150 different types of special uses currently categorized by the Forest Service, usually granted for specific periods up to 30 years. The Custer Gallatin currently administers more than 800 special use authorizations, including more than 450 recreation uses and more than 350 non-recreational uses. (Timber, minerals and grazing uses are handled separately.) Following is a partial list of Custer Gallatin special use authorization types.

- recreation residences
- outfitter and guide services
- water
- communication uses
- recreation sites
- energy and gas transmission
- rights-of-way (roads and trails)
- research and training
- community services and public information
- special events
- industry
- agriculture



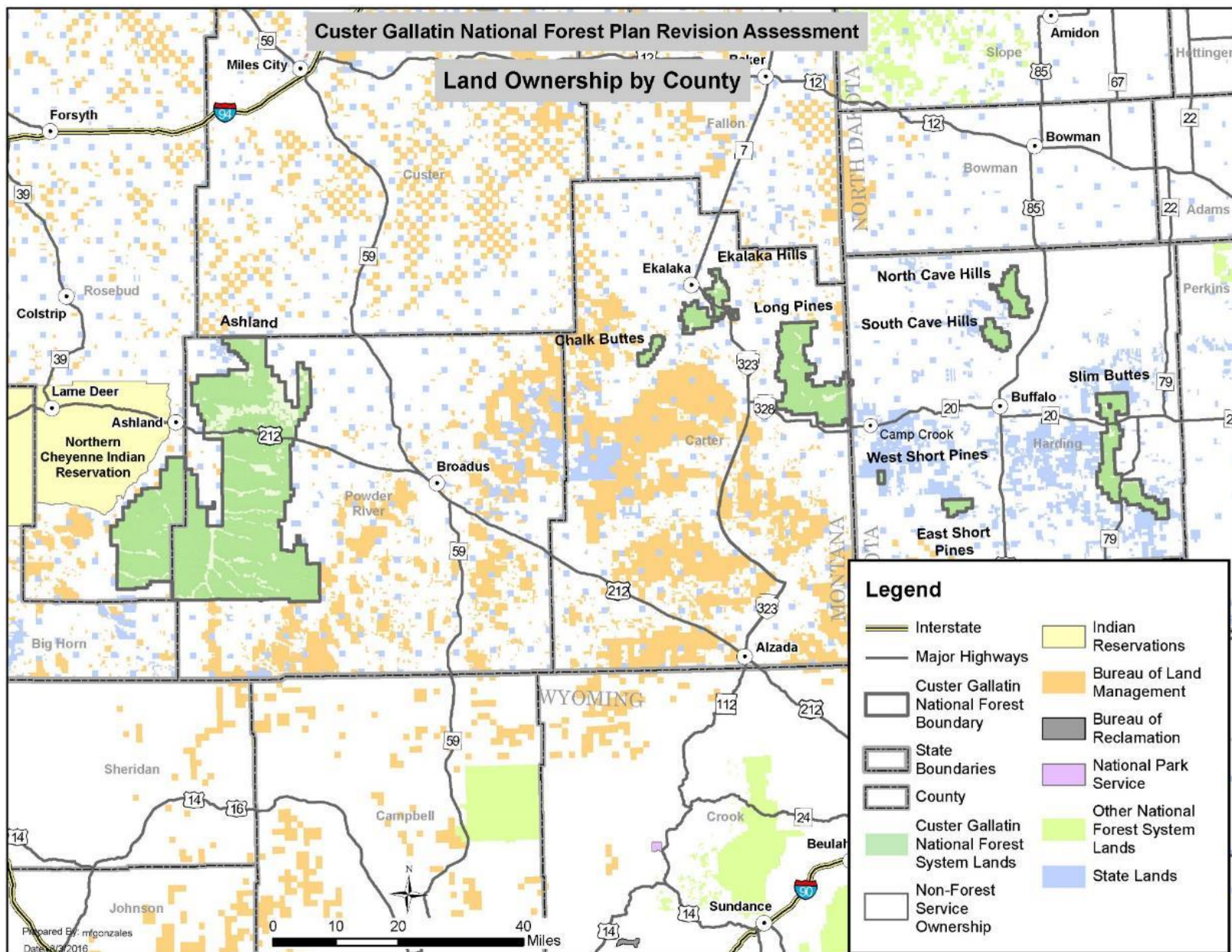


Figure 26. Land ownership by county, east side of Custer Gallatin National Forest

Looking Forward: Conclusions and Concerns

Custer Gallatin land management requires consideration of many laws, directives and priorities. Social and economic changes regarding public access, conservation values, private property development and other factors all must be considered by national forest planners. While many improvements have been made over the last 30 years, land use conflicts remain and will undoubtedly continue. Land acquisition is helping to resolve some issues, but budgets and national forest personnel resources are declining. Given current conditions, Custer Gallatin managers will need to increasingly rely on nonprofit organizations, local advocacy groups and State resources to resolve land use conflicts and, in some cases, special use requests.

Information needs related to the forest plan revision process include identifying where existing utility and communications corridors are located, where special use authorizations are in place, where uses overlap, where access is inadequate or unofficial, and where future human development is expected. Records should also be updated to include right-of-way acquisition data from more than 20 years ago. This information will help Custer Gallatin managers develop criteria for land use decisions and to determine where right-of-way corridors are most needed.

Additional Information

Nash, K. 2016. Assessment for Forest Plan Revision – Land Status and Ownership, Use, and Access Patterns Report, Custer Gallatin National Forest.

www.fs.usda.gov/detail/custergallatin/landmanagement/planning/?cid=fseprd520802.

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